

# The Surface Tension of Pure Liquid Compounds

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The surface tension tables presented herein are the result of a literature survey, evaluation, and compilation of data of some 2200 pure liquid compounds, 226 of which were reported for a single temperature. These are arranged with related compounds in the increasing order of their molecular weights. As far as possible the method of measurement, nature of atmosphere to which the liquid was exposed during measurements, and the estimated accuracy are given for each liquid. The tabulated values were calculated from the derived results of directly measured quantities reported in the literature of many countries from about 1874 to 1969. Preliminary plots of the experimentally measured quantities indicated that the surface tensions of the liquid compounds are linear functions of the temperature over the reported operational range. The principle of least squares was applied to experimental surface tension values to establish the regression curves and their equations. The constants of the equations (slope and intercept), together with the standard deviations are given for each compound. The selection factors establishing criteria of quality of surface tension data are discussed. These include (a) method of measurement, (b) purity of compound, (c) quality of apparatus and assembly, (d) experimental procedure (experimentation), (e) reliability of measurements (most probable values), (f) experience of investigator, and (g) availability of data. There are 274 references listed alphabetically.

Key words: Surface tension; liquids; thermodynamics of liquids; evaluated data.

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## 1. Introduction

The following tables present, in the opinion of the writer, the best values of the surface tensions presently available for the compounds listed. The compounds which were studied are those which are liquid in the general vicinity of room temperature and below; the cryogenic fluids are also included. The writer has tried his best to be comprehensive in coverage within this range. References run from the 19th century through 1969.

In addition to compiling the data available in the literature the writer has evaluated these data and estimated their reliability. A discussion of the methods used in evaluating the data and determining their reliability is given below.

### 1.1. Contents of the Tables

The tables have been arranged, as far as possible, with related compounds in the order of their increasing molecular weights. With one exception the tables present values of the surface tension at integral values of the temperature in degrees Celsius. The exception is the final table which contains data for those compounds that have been studied at only one temperature.

The range of temperatures covered in the tables for a given compound reflects the range covered by the set or sets of measurements selected as most reliable. For the large majority of the compounds the dependence of the

surface tension (given in dyn/cm)<sup>1</sup> on the temperature can be given as

$$\gamma = a - bt$$

where  $a$  and  $b$  are constants and  $t$  is the temperature in degrees Celsius. The values of  $a$  and  $b$  obtained by least-squares fitting of the experimental values are given in the tables and can be used to interpolate within the operational range. The numbers,  $\sigma_v$ , given in the tables are standard deviations of the residuals resulting from the fit and give a measure of the scatter of the experimental measurements about the line. For a few compounds, for which measurements were available over a rather large temperature range, the van der Waals-Guggenheim equation [ref. 82] was applied. In these cases the equation used is included in the table.

An estimate of the reliability of the data is given in each table and will be found in the space above the columns of numbers or in footnotes. Where one investigator reported an extended series of measurements in one table and used the same apparatus and procedures throughout, the same reliability value was assumed to apply to all entries in the table.

Whenever the information is available, the method of measurement is given, together with the nature of the atmosphere to which the liquid was exposed during the measurement. Air is designated as A; nitrogen, N<sub>2</sub>; hydrogen, H<sub>2</sub>; helium, He; etc. In the case of measurements made within a closed system, the liquid was in equilibrium with its own vapor. This situation is indicated by the letter, V.

### 1.2. The Figures

For a number of liquids, for which several sets of measurements over a temperature range exist, plots were made comparing the values selected by the writer with those measured experimentally or selected by other workers. These deviation plots are shown in figures 1-56. The 56 liquids represent those liquids for which the most data are available, with the exception of water. A plot was not given for water since the surface tension of water is known with sufficient precision that a plot of the recommended values against the principal measurements, as listed in table 86, would show no deviations on a scale comparable with that of the other figures. Also Gittens [72 aa] has recently made a fine-grained analysis of the data for water and his recommended values differ negligibly from those recommended here.

### 1.3. Finding a Given Compound and the Index

The presentation of the data involved formidable problems in nomenclature. Since the measurements cited cover a time span of nearly 100 years, many of the names supplied in the original papers had to be changed to make them conform to modern usage and hence make them intelligible to as large a body of readers as possible. An attempt was made to follow the practices of *Chemical*

<sup>1</sup> 1 dyn/cm = 10<sup>-3</sup> N/m.



*Abstracts* in the text and in indexing. Trivial names, or names from other systems of nomenclature which are widely used are usually cross referenced in the Index. Further details are provided at the start of the Index.

The compounds are grouped in the tables according to chemical type, and this is reflected in the naming and numbering of the tables. Usually, the proper table for a given compound can be found by looking at the List of Tables. However, compounds for which data are available only at a single temperature are grouped together. Furthermore, an author making systematic measurements on a class of compounds would occasionally include some compounds of another class which provided interesting comparisons because of structural relationships: for example, an author studying esters of a given acid might include measurements on the acid itself. Because the interest provided by the comparisons may still exist for many readers and because the estimate of error tends to remain constant within a given series of this type, such tables were included as they were initially presented. In any event all compounds in the tables can be located in the Index.

#### 1.4. The Selection of the Recommended Data and the Estimation of Reliability

The selection of data to be recommended and the estimation of their reliability involve several factors, the most important of which are (a) amount of data available, (b) method of measurement, (c) purity of compound, (d) quality of apparatus and assembly, (e) experimental procedure, (f) experience of the investigator. The interplay of these factors in the case of each compound or set of measurements will not be described in detail. However, in what follows the principles used by the writer in the selection of the data and the estimation of their reliability will be given.

##### a. Amount of Data Available

A review of the literature from 1880 to the present time reveals that surface tension measurements for a large number of liquids have been reported but once. Since it was deemed desirable to make the present compilation as comprehensive as possible, these were included regardless of their probable degree of accuracy. It should be clear that there is no direct check on the accuracy of the measurements on these compounds, and that the accuracy is estimated indirectly from the other factors listed above.

##### b. Methods of Measurement

The surface tension data tabulated in the tables which follow were measured by one or more of the static methods [see ref. 108a]. These methods are concerned with liquid systems whose surfaces are relatively stationary and have existed long enough to permit the contiguous phases to attain a state of equilibrium with them.

The method which is truly static involves the spontaneous rise of a liquid in a capillary tube. It is the simplest

and most accurate and can be used over a wide temperature range. The experimental conditions are so clearly defined and the mathematical theory so simple that the accuracy of the measurements is limited largely to the design of the capillarimeter and any procedural errors introduced by the operator.

The capillary-rise apparatus has numerous variants. Many novel designs have appeared in the literature: some, to meet special experimental conditions; others, to obtain precise results with a minimum of liquid; and still others, to circumvent the time-consuming effort involved in the selection and testing of component parts of the capillarimeter. Although the capillary-rise method is accepted as the ultimate standard for the determination of liquid surface-tensions, the fact remains that high precision is obtained only by rigorously conforming to certain structural and dimensional specifications in designing the capillarimeter. Three directly measurable components only are involved in the capillary-rise equation. Thus, the determinate and indeterminate errors are relatively few and, therefore, the accuracy is very high.

For liquids which form an appreciable glass-liquid contact angle, alternative methods, such as the maximum bubble-pressure or drop-weight, are generally used. The experimental procedures for these are somewhat more complex, but in the hands of an experienced and expert operator the results are very reliable.

##### c. Purity of Compound

One fundamental requisite, probably the most important in determining the accuracy of surface tension data, is the purity of the compounds involved. Although compounds of very high purity are now readily available, this was decidedly not the case even a few years ago, when most investigators had to prepare their own compounds. Therefore, in the evaluation of surface tension data careful attention must be paid to the efforts investigators have made to obtain their compounds in pure form and to document their purity.

Other things being equal, surface tension measurements made in recent years on a given compound are probably more accurate than those reported previously. The probable purity of the compound played an important role in the decision of the writer in selecting a given set of data for the tables. This selection was frequently guided by advice from authorities in chemical preparative methods who reviewed the various reports on the compounds involved.

##### d. Quality of Apparatus and Assembly

It has been pointed out that a given method for measuring the liquid surface tension may have many variants. These manifest themselves in variations of design of the principal apparatus and in the organization of the various essential parts of the total assembly. The writer has observed that equally experienced operators using different variants of the same technique on the same compound can obtain differing results. In comparing different measurements,

other things being equal, the writer has a preference for the simpler apparatus.

#### e. Experimental Procedure

The writer attached greater weight to those papers in which the experimenter either gave replicate measurements that allowed a measure of random errors to be derived or derived such a measure himself.

#### f. Experience of the Investigator

Some investigators conducted extensive series of measurements over a period of years. When this occurred it was usually possible to compare their results in some cases with results of other workers of recognized capability, and thus obtain an estimate of their reliability. When discrepancies occurred the writer gave greater weight to the results of an investigator with a proven record of reliability.

#### g. Estimation of Reliability

The factors listed above were not only used in selection from among competing data sets but also in determining the reliability of a given data set. In addition the writer utilized the following sources in estimating reliability: reliability estimates made by the author of the compiled values which appear in the *International Critical Tables*, estimates made by the investigator in reporting his measurements, calculations of the magnitude of random errors, and estimates based on comparisons with data of known reliability.

## 2. Acknowledgments

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## 3. Tables of Surface Tensions

TABLE I. Acetals [242]  
(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_s$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Dimethoxymethane.....	21.79	21.19	19.99	-----	-----	-----	-----	-----	-----	23.59	0.1199	$\pm 0.06$
Diethoxymethane.....	21.93	20.29	20.00	18.71	17.41	16.12	-----	-----	-----	23.87	0.1291	$\pm 0.21$
Dipropoxymethane.....	23.74	23.26	22.31	21.36	20.40	19.45	18.50	17.55	16.59	25.17	0.0953	$\pm 0.05$
Dibutoxymethane.....	25.00	24.57	23.69	22.81	21.93	21.06	20.18	19.30	18.43	26.32	0.0877	$\pm 0.06$
Diisobutoxymethane.....	-----	22.63	21.76	20.89	20.01	19.14	18.27	17.40	16.53	24.87	0.0871	$\pm 0.04$
Dipentyloxymethane.....	26.43	25.97	25.03	24.10	23.17	22.24	21.31	20.37	19.44	27.83	0.0932	$\pm 0.04$
Dihexyloxymethane.....	27.44	27.02	26.17	25.33	24.48	23.63	22.79	21.94	21.10	28.71	0.0846	$\pm 0.04$
Diisopropoxymethane.....	-----	20.97	20.08	19.20	18.32	17.44	16.56	15.67	14.79	22.73	0.0882	$\pm 0.04$
1,1-Dimethoxyethane.....	22.16	21.58	20.42	19.26	18.10	16.95	-----	-----	-----	23.90	0.1159	$\pm 0.02$
1,1-Diethoxyethane.....	21.91	21.40	20.37	19.34	18.31	17.28	16.25	15.22	14.19	23.46	0.1030	$\pm 0.10$
1,1-Dipropoxyethane.....	23.57	23.09	22.11	21.14	20.17	19.20	18.23	17.25	16.28	25.03	0.0972	$\pm 0.09$
1,1-Dibutoxyethane.....	24.90	24.44	23.51	22.59	21.67	20.75	19.83	18.90	17.98	26.28	0.0922	$\pm 0.06$
1,1-Diisobutoxyethane.....	22.85	22.40	21.52	20.63	19.74	18.85	17.97	17.08	16.19	24.18	0.08877	$\pm 0.02$

TABLE 2.1. Acetylenes [80]  
(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>
1-Hexyne...	20.98					
1-Heptyne...	22.68	20.59	18.51		24.76	0.1042
1-Octyne...	23.86	21.78	19.70		25.94	0.1040
1-Nonyne...	25.01	23.03	21.05	18.58	26.99	0.09893
1-Decyne...	25.93	24.01	22.08	19.67	27.86	0.09637
1-Undecyne...	26.59	24.71	22.82	20.47	28.47	0.094124
1-Dodecyne...	27.27	25.36	23.44	21.05	29.19	0.09581
1-Tridecyne...	27.56	25.68	23.80	21.46	29.44	0.09395
3-Cyclohexylpropyne	29.81	27.85	25.90	23.46	31.76	0.09764

TABLE 2.2. Diesters of 2-butyne-1,4-diol [80]  
(Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>
Formate...		45.64	42.75	39.15	51.42	0.1444
Acetate...		38.20	35.77	32.72	43.08	0.1219
Propionate...	36.16	34.07	31.98	29.37	38.25	0.1045
Butyrate...	33.15	31.41	29.69	27.51	34.88	0.0867
Valerate...	32.03	30.41	28.79	26.76	33.65	0.08107
Hexanoate...	31.50	29.86	28.21	26.16	33.14	0.0821
Heptanoate...	31.23	29.79	28.34	26.53	32.68	0.0724

TABLE 2.3. 2-Propyn-1-ol and its esters [80]  
(Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>
Formate...	35.00	32.17	29.34		37.83	0.1415
Acetate...	32.82	30.20	27.57		35.45	0.1313
Propionate...	31.25	28.85	26.44	23.44	33.65	0.1201
Butyrate...	30.04	27.84	25.65	22.90	32.24	0.1099
Valerate...	29.80	27.70	25.60	22.97	31.90	0.1050
Hexanoate...	29.46	27.50	25.53	23.07	31.43	0.09837
Heptanoate...	29.68	27.78	25.89	23.52	31.58	0.09488
2-Propyn-1-ol...	36.05	33.50	30.97		38.59	0.1270

TABLE 3. Acetylenic esters [115]  
 (Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.1$ )									Least squares constants		$\sigma_1$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Methyl 3-butynoate.....	33.57	32.94	31.68	30.42	29.16	27.90	26.64	25.38	24.12	35.46	0.1260	$\pm 0.07$
Ethyl 3-butynoate.....	31.00	30.43	29.28	28.13	26.97	25.82	24.67	23.52	22.37	32.73	0.1151	$\pm 0.07$
Propyl 3-butynoate.....	30.43	29.88	28.78	27.69	26.59	25.49	24.40	23.30	22.21	32.07	0.1096	$\pm 0.07$
Butyl 3-butynoate.....		29.42	28.41	27.41	26.40	25.40	24.39	23.39	22.38	21.43	0.1005	$\pm 0.06$
Methyl 9-decynoate.....	33.61	33.10	32.06	31.02	29.98	28.95	27.91	26.87	25.84	35.17	0.1037	$\pm 0.03$
Ethyl 9-decynoate.....	32.48	31.97	30.94	29.91	28.88	27.86	26.83	25.80	24.78	34.02	0.1027	$\pm 0.08$
Propyl 9-decynoate.....		31.74	30.78	29.83	28.87	27.92	26.96	26.01	25.05	33.65	0.0955	$\pm 0.03$
Ethyl undecanoate <sup>a, b</sup> .....	28.78	28.34	27.44	26.54	25.64	24.75	23.85	22.95	22.06	30.13	0.0897	$\pm 0.07$
Dimethyl acetylenedicarboxylate.....	38.52	37.91	36.70	35.48	34.27	33.06	31.84	30.63	29.41	40.34	0.1214	$\pm 0.09$
Diethyl acetylenedicarboxylate.....	33.82	33.31	32.27	31.24	30.21	29.18	28.15	27.11	26.08	35.37	0.1032	$\pm 0.06$
Dipropyl acetylenedicarboxylate.....		32.18	31.23	30.27	29.31	28.35	27.39	26.44	25.48	34.10	0.0958	$\pm 0.10$
Diisopropyl acetylenedicarboxylate.....		30.67	29.75	28.82	27.89	26.96	26.03	25.11	24.18	32.53	0.0928	$\pm 0.08$
Dibutyl acetylenedicarboxylate.....	32.17	31.72	30.82	29.92	29.02	28.12	27.22	26.32	25.42	33.52	0.0900	$\pm 0.05$
Dipentyl acetylenedicarboxylate.....	31.84	31.42	30.58	29.73	28.89	28.05	27.20	26.36	25.51	33.11	0.0844	$\pm 0.10$
Diisopentyl acetylenedicarboxylate.....		30.68	29.84	28.99	28.15	27.31	26.46	25.62	24.77	32.37	0.0844	$\pm 0.02$
Propyl phenylpropiolate.....	37.58	37.07	36.05	35.04	34.02	33.01	31.99	30.98	29.96	39.10	0.1015	$\pm 0.08$
Butyl phenylpropiolate.....		36.21	35.29	34.36	33.43	32.50	31.57	30.65	29.72	38.07	0.0928	$\pm 0.04$
Isobutyl phenylpropiolate <sup>b</sup> .....	35.50	35.05	34.14	33.22	32.31	31.40	30.49	29.58	28.67	36.87	0.09116	$\pm 0.01$

<sup>a</sup> Not acetylenic.<sup>b</sup> Ref. [255] (Cap. Rise-A) ( $\pm 0.3$ ).

TABLE 4. Tertiary alcohols [162, 173]  
 (Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.1$ )					Least squares constants	
	25°	35°	45°	55°	65 °C	<i>a</i>	<i>b</i>
3-Methyl-3-hexanol.....	24.44	23.53	22.62	21.73	20.80	26.72	0.0910
3-Ethyl-3-hexanol.....	25.55	24.66	23.77	22.88	21.99	27.77	0.0880
1-Methyl-4-heptanol.....	24.68	23.70	22.73	21.75	20.78	27.12	0.0976
1-Ethyl-4-heptanol.....	25.22	24.41	23.61	22.80	22.00	27.24	0.08075
1-Propyl-4-heptanol.....	25.05	24.25	23.45	22.65	21.85	27.05	0.0800
2-Methyl-2-hexanol.....	23.74	22.86	21.87	21.09	20.20	25.96	0.0886
3-Ethyl-3-pentanol.....	25.25	24.36	23.47	22.57	21.68	27.49	0.0894
2-Methyl-2-octanol.....	25.41	24.56	23.72	22.89	22.03	27.52	0.08455
3-Methyl-3-nonanol.....	26.12	25.27	24.41	23.55	22.69	28.27	0.08585
1-Methyl-4-decanol.....	26.05	25.22	24.38	23.55	22.72	28.14	0.08345
5-Methyl-5-undecanol.....	26.13	25.32	24.50	23.69	22.87	28.17	0.0815
6-Methyl-6-dodecanol.....	26.07	25.46	24.84	24.22	23.60	27.62	0.0618
tert-Butyl alcohol.....	19.96	19.06	18.16	17.26	16.36	22.21	0.0900
3-Methyl-3-heptanol.....	25.21	24.27	23.34	22.40	-----	27.54	0.09339
4-Methyl-4-octanol.....	25.61	24.63	23.64	22.66	-----	28.07	0.09841
5-Methyl-5-nonanol.....	26.20	25.21	24.23	23.24	-----	28.66	0.09854
2-Methyl-2-heptanol.....	24.76	23.81	22.86	21.91	-----	27.14	0.0951
3-Methyl-3-octanol.....	26.05	25.12	24.18	23.24	-----	28.40	0.09382
1-Methyl-4-nonanol.....	25.72	24.87	24.02	23.17	-----	27.84	0.08483
5-Ethyl-5-decanol.....	26.58	25.70	24.81	23.94	-----	28.79	0.08836
5-Propyl-5-decanol.....	26.28	25.45	24.62	23.79	-----	28.35	0.0829
5-Butyl-5-decanol.....	26.84	25.95	25.05	24.16	-----	29.08	0.08954

TABLE 5.1. Aldehydes

Compound	Surface tension										Least squares constants		$\sigma_7$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	<i>a</i>	<i>b</i>	
Acetaldehyde <sup>a</sup> .....	22.54	21.18	19.82	18.46	17.10	-----	-----	-----	-----	-----	23.90	0.1360	$\pm 0.08$
Paraldehyde <sup>b</sup> .....	27.22	26.16	25.09	24.03	22.97	21.91	20.85	19.78	18.72	17.60	28.28	0.1062	-----
Butyraldehyde <sup>c</sup> .....	25.74	24.82	23.89	22.97	22.04	21.12	20.19	-----	-----	-----	26.67	0.0925	-----
Valeraldehyde <sup>c</sup> .....	26.95	25.94	24.93	23.92	22.91	21.90	20.89	-----	-----	-----	27.96	0.1010	-----
Isovaleraldehyde <sup>d</sup> .....	24.70	23.69	22.67	21.66	20.65	19.64	18.63	17.61	16.60	-----	25.71	0.1012	-----
Heptanal <sup>c</sup> .....	27.72	26.84	25.84	24.96	24.08	23.19	22.20	-----	-----	-----	28.64	0.0920	-----
Benzaldehyde <sup>b</sup> .....	39.63	38.54	37.45	36.36	35.7	34.18	33.09	32.00	30.91	29.82	40.72	0.1090	-----
Cumaldehyde <sup>d</sup> .....	34.91	34.03	33.14	32.26	31.37	30.48	29.60	28.71	27.83	26.94	35.80	0.08861	-----
Salicylaldehyde <sup>f</sup> .....	-----	42.90	41.65	40.41	39.17	37.93	36.69	35.44	34.20	32.96	45.38	0.1242	$\pm 0.06$
2-Furaldehyde <sup>d</sup> .....	45.08	43.76	42.39	41.10	39.78	38.45	37.12	35.79	34.47	33.14	46.11	0.1327	-----
Trichloroacetaldehyde <sup>g</sup> .....	26.46	25.27	24.07	22.87	21.67	20.48	19.28	18.08	-----	-----	27.66	0.1197	-----

<sup>a</sup> Ref. [142] (Capillary Rise Method-A).<sup>b</sup> Ref. [134] (Drop Weight-A) ( $\pm 0.50$ ).<sup>c</sup> Ref. [126] (Maximum Bubble Pressure-A) ( $\pm 0.10$ ).<sup>d</sup> Ref. [192] (Capillary Rise Method-A) ( $\pm 0.70$ ).<sup>e</sup> Ref. [87] (Drop Weight-A) ( $\pm 0.30$ ).<sup>f</sup> Ref. [27] (Maximum Bubble Pressure-A) ( $\pm 0.20$ ).<sup>g</sup> Ref. [177] (Capillary Rise Method-A) ( $\pm 0.10$ ).<sup>h</sup> Ref. [193] (Capillary Rise Method-A) ( $\pm 0.4$ ).

TABLE 5.2. Aldehydes (higher melting)

Compound	Surface tension											Least squares constants		$\sigma_7$
	60°	70°	80°	90°	100°	110°	120°	140°	160°	180°	200 °C	a	b	
<i>m</i> -Hydroxybenzaldehyde <sup>a</sup>						41.96	41.10	39.36	37.62	35.89	34.15	51.51	0.08679	±0.24
<i>p</i> -Hydroxybenzaldehyde <sup>a</sup>	48.09	47.34	46.59	45.84	45.09	44.34	43.59	42.08				52.59	0.07504	±0.25
4-Hydroxy-3-methoxybenzaldehyde <sup>b</sup>			41.08	39.85	38.62	37.39	36.16	33.70	31.23	28.77	26.31	50.93	0.1231	

<sup>a</sup> Ref. [27] (Max. Bubble Pressure-A) (±0.20).<sup>b</sup> Ref. [200] (Max. Bubble Pressure-A) (±0.20).

TABLE 6. Aliphatic haloesters

(Capillary Rise-A)

Compound	Surface tension										Least squares constants		$\sigma_7$
	10°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b		
Methyl chloroacetate <sup>a</sup>	36.60	35.29	33.99	32.68	31.38	30.08	28.77	27.47	26.16	37.90	0.1304	±0.14	
Methyl dichloroacetate <sup>b</sup>	35.78	34.56	33.34	32.12	30.90	29.69	28.47	27.25	26.03	37.00	0.1219	±0.03	
Methyl trichloroacetate <sup>b</sup>	34.32	33.13	31.95	30.76	29.58	28.40	27.21	26.03	24.84	35.50	0.1184	±0.05	
Ethyl chloroacetate <sup>a</sup>	33.00	31.83	30.65	29.47	28.29	27.12	25.94	24.76	23.59	34.18	0.1177	±0.08	
Ethyl dichloroacetate <sup>b</sup>	33.73	32.57	31.42	30.26	29.10	27.94	26.78	25.63	24.47	34.89	0.1158	±0.12	
Ethyl trichloroacetate <sup>b</sup>	31.90	30.82	29.75	28.68	27.60	26.53	25.46	24.39	23.31	32.97	0.1073	±0.10	
Ethyl chloroformate <sup>c</sup>	27.80	26.70	25.70	24.60	23.50	22.40	21.30	20.20	19.10	28.90	0.1084	±0.09	
Propyl chloroacetate <sup>a</sup>	31.83	30.74	29.66	28.58	27.49	26.41	25.33	24.25	23.16	32.91	0.1083	±0.10	
Propyl dichloroacetate <sup>b</sup>	31.81	30.74	29.67	28.60	27.52	26.45	25.38	24.31	23.24	32.88	0.1071	±0.07	
Propyl trichloroacetate <sup>b</sup>	31.50	30.43	29.37	28.31	27.24	26.18	25.12	24.06	22.99	32.56	0.1063	±0.08	
Propyl bromoacetate <sup>a</sup>	33.02	31.96	30.91	29.85	28.79	27.73	26.67	25.62	24.56	34.08	0.1058	±0.09	
Propyl iodoacetate <sup>a</sup>	35.51	34.44	33.37	32.30	31.23	30.17	29.10	28.03	26.96	36.58	0.1069	±0.17	
Butyl chloroacetate <sup>a</sup>	31.20	30.22	29.23	28.25	27.26	26.28	25.29	24.31	23.32	32.19	0.0985	±0.07	
Butyl dichloroacetate <sup>b</sup>	31.48	30.49	29.49	28.50	27.50	26.50	25.51	24.51	23.52	32.48	0.0996	±0.09	
Butyl trichloroacetate <sup>b</sup>	31.14	30.18	29.21	28.25	27.29	26.33	25.37	24.40	23.44	32.10	0.0962	±0.09	
Butyl bromoacetate <sup>a</sup>	32.86	31.87	30.88	29.89	28.90	27.91	26.92	25.93	24.94	33.85	0.0990	±0.05	
Butyl iodoacetate <sup>a</sup>	34.05	33.09	32.14	31.18	30.23	29.28	28.32	27.37	26.41	35.00	0.054	±0.14	
3-Methylbutyl trichloroacetate <sup>d</sup>	29.49	28.56	27.63	26.69	25.76	24.83	23.90	22.97	22.04	30.42	0.09313	±0.12	
Ethyl 2-bromopropionate <sup>e</sup>	31.43	30.36	29.29	28.23	27.16	26.10	25.03	23.97	22.90	32.49	0.1065	±0.04	
<i>l</i> -2-Pentyl 2-bromobutyrate <sup>e</sup>	29.25	28.35	27.45	26.55	25.65	24.75	23.85	22.95	22.05	30.15	0.09003	±0.02	

<sup>a</sup> Ref. [244] (±0.10).<sup>b</sup> Ref. [250] (±0.10).<sup>c</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) (±2.0).<sup>d</sup> Ref. [132] (Drop Weight-A) (±0.2).<sup>e</sup> Ref. [256] (±0.3).

TABLE 7.1. Acetic anhydride [225]  
(Capillary Rise Method-A)

Surface tension ( $\pm 0.20$ )											Least squares constants	
-20°	-10°	10°	20°	30°	40°	50°	60°	80°	100°	110 °C	<i>a</i>	<i>b</i>
38.39	36.96	34.08	32.65	31.21	29.78	28.34	26.90	24.03	21.16	19.72	35.52	0.1436

TABLE 7.2. Aliphatic acids [246]  
(Capillary Rise Method-A)

Acid	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>	
Formic <sup>a</sup> .....	38.22	37.67	36.58	35.48	34.38	33.28	32.18	31.09	29.99	30.87	0.1098	$\pm 0.54$
Acetic.....		27.59	26.60	25.60	24.61	23.62	22.62	21.63	20.63	29.58	0.0994	$\pm 0.09$
Propionic.....	27.19	26.69	25.70	24.71	23.71	22.72	21.73	20.74	19.74	28.68	0.0993	$\pm 0.05$
Butyric.....		26.51	25.59	24.67	23.75	22.83	21.91	20.99	20.07	28.35	0.0920	$\pm 0.02$
Isobutyric.....	25.50	25.04	24.12	23.20	22.28	21.36	20.44	19.52	18.60	26.88	0.0920	$\pm 0.10$
Valeric.....		27.13	26.24	25.35	24.46	23.58	22.69	21.80	20.92	28.90	0.0887	$\pm 0.08$
Isovaleric.....		25.51	24.62	23.74	22.85	21.96	21.08	20.19	19.31	27.28	0.0886	$\pm 0.07$
Myristic <sup>b</sup> .....						28.30	27.50	26.50	25.50	33.90	0.0932	$\pm 0.01$
Levulinic <sup>c</sup> .....				38.64	37.87	37.11	36.35	35.59	34.82	41.69	0.0763	$\pm 0.03$
4-Methylvaleric <sup>d</sup> .....	27.00	26.60	25.81	25.02	24.23	23.45	22.66	21.87	21.08	28.18	0.0789	$\pm 0.07$
Heptanoic <sup>e</sup> .....	28.61	28.18	27.34	26.49	25.64	24.79	23.94			29.88	0.0848	$\pm 0.04$

<sup>a</sup> Ref. [125] ( $\pm 0.5$ ).

<sup>b</sup> Ref. [79] (Ring Pull) ( $\pm 0.10$ ).

<sup>c</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).

<sup>d</sup> Ref. [177] ( $\pm 1.0$ ).

<sup>e</sup> Ref. [86] (Drop Weight) ( $\pm 0.2$ ).

TABLE 8. Aliphatic alcohols [246]

(Capillary Rise Method-A)

Alcohol	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_s$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Methyl.....	23.28	22.50	21.73	20.96	20.18	19.41	-----	-----	-----	-----	24.00	0.0773	$\pm 0.02$
Ethyl.....	23.22	22.39	21.55	20.72	19.89	19.06	18.23	-----	-----	-----	24.05	0.0832	$\pm 0.06$
Propyl.....	24.48	23.71	22.93	22.15	21.37	20.60	19.82	19.04	18.27	-----	25.26	0.0777	$\pm 0.03$
Isopropyl.....	22.11	21.32	20.53	19.74	18.95	18.17	17.38	16.59	-----	-----	22.90	0.0789	$\pm 0.14$
Butyl.....	26.28	25.39	24.50	23.61	22.71	21.82	20.93	20.04	19.14	18.20	27.18	0.08983	$\pm 0.04$
Isobutyl.....	23.73	22.94	22.14	21.35	20.55	19.76	18.96	18.17	17.32	16.58	24.53	0.0795	$\pm 0.05$
Pentanol.....	26.67	25.79	24.92	24.04	23.17	22.30	21.42	20.55	19.67	18.80	27.54	0.0874	$\pm 0.02$
3-Methyl-1-butanol.....	24.94	24.12	23.30	22.48	21.66	20.84	20.02	19.20	18.38	17.56	25.76	0.0820	$\pm 0.04$
2-Pentanol <sup>a</sup> .....	24.96	23.95	22.95	21.94	20.94	19.94	18.93	17.93	16.92	15.92	25.96	0.1004	$\pm 0.02$
2-Methyl-2-butanol <sup>b</sup> .....	23.43	22.68	21.94	21.19	20.44	19.69	18.94	18.20	17.45	-----	24.18	0.0748	-----
Allyl.....	26.63	25.73	24.82	23.92	23.02	22.12	21.22	20.31	19.41	-----	27.53	0.0902	$\pm 0.02$
2-Methoxyethanol.....	32.32	31.33	30.35	29.36	28.38	27.40	26.41	25.43	24.44	23.46	33.30	0.0984	$\pm 0.01$
2-Ethoxyethanol.....	-----	28.80	27.90	27.00	26.10	25.21	24.31	23.41	22.52	21.62	30.59	0.0897	$\pm 0.12$
2-Butoxyethanol.....	27.86	26.55	25.73	24.92	24.10	23.28	22.47	21.65	20.84	20.02	28.18	0.0816	$\pm 0.13$
1-Octanol <sup>c</sup> .....	28.30	27.50	26.70	25.91	25.11	24.32	23.52	-----	-----	-----	29.09	0.0795	$\pm 0.04$
2-Octanol <sup>c</sup> .....	27.14	26.32	25.50	24.68	23.86	23.04	22.22	-----	-----	-----	27.96	0.08197	$\pm 0.04$
1-Nonanol <sup>d</sup> .....	29.03	28.27	27.51	26.75	26.00	25.24	24.48	23.72	22.96	22.20	29.79	0.07589	$\pm 0.16$
1-Decanol <sup>e</sup> .....	29.61	28.88	28.14	27.41	26.68	25.95	25.21	24.48	23.75	23.02	30.34	0.07324	$\pm 0.04$
Myricyl alcohol <sup>e</sup> .....	-----	-----	-----	-----	-----	-----	-----	27.09	26.39	25.69	32.72	0.07033	$\pm 0.06$

<sup>a</sup> Ref. [224] ( $\pm 0.10$ ).<sup>b</sup> Ref. [193] ( $\pm 0.4$ ).<sup>c</sup> Ref. [87] (Drop Weight-A) ( $\pm 0.2$ ).<sup>d</sup> Ref. [48] ( $\pm 0.2$ ).<sup>e</sup> Ref. [191].



TABLE 9. Aliphatic and related carboxylic esters [243]

(Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_7$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°C	<i>a</i>	<i>b</i>	
Methyl myristate <sup>a</sup>		29.40	28.60	27.80	27.00	26.20	25.40	24.60	23.80	23.00	31.00	0.0800	$\pm 0.15$
Methyl palmitate <sup>a</sup>		29.95	29.17	28.40	27.62	26.85	26.07	25.30	24.52	23.75	31.50	0.0775	$\pm 0.15$
Ethyl palmitate <sup>b</sup>			30.28	29.42	28.56	27.71	26.85	25.99	25.13	24.27	32.86	0.0859	$\pm 0.14$
Methyl stearate <sup>a</sup>		30.65		29.87	29.10	28.32	27.55	26.77	26.00	25.22	32.20	0.0775	$\pm 0.15$
Methyl acetate	26.66	25.87	24.08	22.79	21.50	20.22					27.95	0.1289	$\pm 0.08$
Ethyl acetate <sup>c</sup>	25.13	23.97	22.81	21.65	20.48	19.32	18.16	17.00	15.84	14.68	26.29	0.1161	$\pm 0.10$
Propyl acetate	25.48	24.36	23.24	22.12	21.00	19.88	18.76	17.64	16.52	15.40	26.60	0.1120	$\pm 0.05$
Isopropyl acetate	23.37	22.30	21.22	20.05	19.08	18.01	16.94	15.86			24.44	0.1072	$\pm 0.05$
Butyl acetate	26.48	25.41	24.35	23.28	22.21	21.14	20.07	19.01	17.94	16.87	27.55	0.1068	$\pm 0.08$
Isobutyl acetate	24.07	23.56	22.55	21.54	20.52	19.51	18.50	17.49	16.47	15.46	25.59	0.1013	$\pm 0.03$
sec-Butyl acetate	24.67	23.61	22.56	21.50	20.45	19.40	18.34	17.29	16.23	15.18	25.72	0.1054	$\pm 0.07$
tert-Butyl acetate	23.59	22.49	21.38	20.28	19.18	18.08	16.98	15.87			24.69	0.1102	$\pm 0.01$
Isobutyl ricinoleate <sup>d</sup>	32.31	31.54	30.77	29.99	29.22	28.45	27.68	26.91	26.14	25.37	33.08	0.07714	$\pm 0.01$
1-Pentyl acetate	26.67	25.16	24.68	23.68	22.69	21.69	20.70	19.71	18.71	17.72	27.66	0.09943	$\pm 0.05$
3-Methylbutyl acetate	25.76	24.77	23.78	22.79	21.80	20.82	19.83	18.84	17.85	16.86	26.75	0.0989	$\pm 0.06$
Hexyl acetate	27.47	26.50	25.53	24.56	23.59	22.62	21.65	20.68	19.71	18.74	28.44	0.0970	$\pm 0.07$
Methyl formate <sup>e</sup>	26.72	25.15	23.57	22.00	20.43	18.86	17.29	15.71	14.14	12.57	28.29	0.1572	$\pm 0.20$
Ethyl formate	24.50	23.84	22.52	21.21							26.47	0.1315	$\pm 0.08$
Propyl formate	25.65	24.53	23.41	22.29	21.17	20.06	18.94				26.77	0.1119	$\pm 0.06$
Isopropyl formate	22.84	22.27	21.12	19.97	18.82						24.56	0.1147	$\pm 0.02$
Butyl formate	26.05	25.03	24.00	22.98	21.95	20.92	19.90	18.87	17.85	16.82	27.68	0.1026	$\pm 0.02$
Isobutyl formate	24.46	23.96	22.77	21.65	20.53	19.41	18.29	17.16			26.14	0.1122	$\pm 0.05$
1-Pentyl formate	27.07	26.04	25.02	24.00	22.97	21.95	20.93	19.91	18.88	17.86	28.09	0.1023	$\pm 0.03$
Isopentyl formate	25.76	24.89	23.87	22.85	21.83	20.82	19.80	18.78	17.77	16.75	26.92	0.1017	$\pm 0.04$
Hexyl formate	27.82	26.85	25.89	24.92	23.96	23.00	22.03	21.07	20.10	19.14	28.78	0.0964	$\pm 0.07$
Methyl propionate	26.32	25.06	23.81	22.55	21.29	20.03	18.77				27.58	0.1258	$\pm 0.06$
Ethyl propionate	25.55	24.38	23.22	22.05	20.88	19.71	18.54	17.38			26.72	0.1168	$\pm 0.05$
Propyl propionate	25.80	24.74	23.68	22.62	21.56	20.51	19.45	18.39	17.33	16.27	26.86	0.1059	$\pm 0.04$
Butyl propionate	26.38	25.38	24.39	23.40	22.40	21.41	20.42	19.43	18.43	17.44	27.37	0.0993	$\pm 0.06$
Methyl butyrate	26.33	25.19	24.04	22.90	21.75	20.61	19.46	18.32	17.17	16.03	27.48	0.1115	$\pm 0.06$
Methyl isobutyrate	24.86	23.73	22.60	21.47	20.33	19.20	18.07	16.94	15.81	14.68	25.99	0.1131	$\pm 0.02$
Ethyl butyrate	25.50	24.46	23.41	22.37	21.32	20.28	19.23	18.19	17.14	16.10	26.55	0.1045	$\pm 0.03$
Propyl butyrate	26.06	25.06	24.06	23.06	22.06	21.06	20.06	19.06	18.06	17.06	27.06	0.1000	$\pm 0.04$
Butyl butyrate	26.68	25.72	24.75	23.79	22.82	21.86	20.89	19.93	18.96	18.00	27.65	0.0965	$\pm 0.06$
Isobutyl butyrate <sup>1</sup>	23.63	22.78	21.94	21.10	20.25	19.41	18.57	17.63	16.88	16.04	24.17	0.0843	$\pm 0.03$
1-Pentyl butyrate	27.02	26.11	25.20	24.29	23.38	22.48	21.57	20.66	19.75	18.84	27.93	0.0909	$\pm 0.08$
Isopentyl butyrate	26.40	25.48	24.57	23.65	22.73	21.81	20.89	19.98	19.06	18.14	27.32	0.0918	$\pm 0.04$
Ethyl isobutyrate	24.28	23.24	22.19	21.15	20.10	19.05	18.01	16.96	15.92	14.87	25.33	0.1046	$\pm 0.07$
Propyl isobutyrate	24.81	23.80	22.78	21.77	20.75	19.74	18.72	17.71	16.69	15.68	25.83	0.1015	$\pm 0.09$
Butyl isobutyrate	25.47	24.49	23.50	22.51	21.52	20.54	19.55	18.56	17.58	16.59	26.46	0.0987	$\pm 0.04$
Methyl valerate	26.81	25.76	24.72	23.67	22.63	21.59	20.54	19.50	18.45	17.41	27.85	0.1044	$\pm 0.01$
Methyl isovalerate	25.28	24.24	23.20	22.16	21.12	20.08	19.09	18.00	16.96	15.92	26.32	0.1040	$\pm 0.04$
Ethyl valerate	26.19	25.15	24.14	23.15	22.15	21.16	20.16	19.16	18.16	17.16	27.15	0.0999	$\pm 0.02$
Ethyl isovalerate	24.78	23.78	22.77	21.77	20.76	19.75	18.75	17.74	16.74	15.73	25.79	0.1006	$\pm 0.10$
Propyl valerate	26.76	25.77	24.79	23.80	22.82	21.84	20.85	19.87	18.88	17.90	27.74	0.0981	$\pm 0.05$
Propyl isovalerate	25.48	24.53	23.75	22.62	21.67	20.72	19.77	18.81	17.86	16.91	26.43	0.0952	$\pm 0.08$
Butyl valerate	27.22	26.22	25.22	24.22	23.21	22.21	21.21	20.21	19.21	18.21	28.22	0.1001	$\pm 0.07$
Butyl isovalerate	26.11	25.16	24.22	23.27	22.33	21.39	20.44	19.50	18.55	17.61	27.05	0.0944	$\pm 0.13$
Isobutyl valerate <sup>6</sup>	24.24	23.40	22.57	21.73	20.90	20.07	19.23	18.40	17.56	16.73	25.07	0.0834	$\pm 0.05$
Methyl hexanoate	27.42	26.38	25.33	24.29	23.24	22.20	21.15	20.11	19.06	18.02	28.47	0.1045	$\pm 0.10$
Ethyl hexanoate	26.77	25.81	24.83	23.89	22.93	21.97	21.01	20.05	19.09	18.13	27.73	0.0960	$\pm 0.03$
Methyl heptanoate	27.96	26.98	25.99	25.00	24.01	23.03	22.04	21.05	20.07	19.08	28.95	0.0987	$\pm 0.08$
Ethyl heptanoate	27.38	26.44	25.50	24.56	23.62	22.69	21.75	20.89	19.87	18.93	28.32	0.0939	$\pm 0.03$
Methyl octanoate	28.93	27.93	26.92	25.92	24.92	23.92	22.92	21.91	20.91	19.91	29.93	0.1002	$\pm 0.08$
Ethyl octanoate	28.41	27.44	26.47	25.49	24.52	23.55	22.58	21.61	20.64	19.66	29.38	0.09716	$\pm 0.16$
Methyl decanoate	29.42	28.51	27.59	26.68	25.77	24.86	23.95	23.03	22.12	21.21	30.33	0.0912	$\pm 0.04$
Ethyl decanoate	29.07	28.15	27.23	26.31	25.38	24.46	23.54	22.62	21.70	20.78	29.99	0.0921	$\pm 0.06$

TABLE 9. Aliphatic and related carboxylic esters [243]—Continued

Compound	Surface tension ( $\pm 0.10$ )										Least-squares constants		$\sigma_7$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Propyl decanoate.....	29.16	28.29	27.41	26.54	25.66	24.78	23.91	23.03	22.16	21.28	30.04	0.0876	$\pm 0.10$
Butyl decanoate.....	29.41	28.53	27.66	26.78	25.90	25.02	24.14	23.27	22.39	21.51	30.29	0.0878	$\pm 0.04$
Methyl dodecanoate.....	30.40	29.50	28.69	27.80	26.91	26.01	25.12	24.23	23.34	22.44	31.37	0.08927	$\pm 0.04$
Ethyl dodecanoate.....	29.19	28.32	27.46	26.60	25.74	24.87	24.01	23.15	22.28	21.42	30.05	0.08628	$\pm 0.05$
Propyl dodecanoate.....	29.65	28.81	27.97	27.13	26.29	25.45	24.61	23.77	22.93	22.09	30.49	0.0840	$\pm 0.10$
Butyl dodecanoate.....	30.02	29.15	28.27	27.40	26.52	25.64	24.77	23.89	23.02	22.14	30.90	0.0876	$\pm 0.11$
Ethyl lactate <sup>i</sup> .....		28.75	27.77	26.79	25.80	24.82	23.84	22.86	21.87	20.89	30.72	0.0933	$\pm 0.04$
1-Pentyl stearate <sup>i</sup> .....			28.35	27.61	26.87	26.13	25.39	24.65	23.91	23.16	30.57	0.07395	$\pm 0.11$
Methyl acetoacetate <sup>i</sup> .....	34.04	33.09	32.15	31.20	30.26	29.32	28.37	27.43	26.48	25.54	34.98	0.0944	$\pm 0.17$
Ethyl acetoacetate <sup>i</sup> .....	33.40	32.39	31.37	30.36	29.34	28.33	27.31	26.30	25.28	24.27	34.42	0.1015	$\pm 0.08$
Ethyl 2-acetylvalerate <sup>i</sup> .....	30.78	29.86	28.93	28.00	27.08	26.15	25.22	24.29	23.37	22.44	31.71	0.09269	$\pm 0.38$
Ethyl 2-allylaceto- acetate <sup>i</sup> .....	31.24	30.30	29.36	28.41	27.47	26.53	25.59	24.65	23.71	22.77	32.18	0.09413	$\pm 0.03$
Ethyl 2,2-dimethyl- acetoacetate <sup>i</sup> .....			28.55	27.48	26.41	25.34					31.75	0.1068	$\pm 0.40$
Ethyl 2-ethylaceto- acetate <sup>h</sup> .....			28.90	27.94	26.98	26.02	25.06	24.10	23.14	22.18	31.78	0.09598	$\pm 0.06$
Ethyl 2,2-diethyl- acetoacetate <sup>i</sup> .....			27.23	26.29	25.36	24.43					30.03	0.0934	$\pm 0.40$
Methyl levulinate <sup>h</sup> .....			31.45	30.38	29.31	28.25	27.18	26.11	25.05	23.98	34.65	0.1067	$\pm 0.15$
Ethyl 2-isopentylaceto- acetate <sup>h</sup> .....			27.23	26.43	25.59	24.75	23.91	23.07	22.23	21.38	29.80	0.08415	$\pm 0.10$
Methyl 2-methylaceto- acetate <sup>i</sup> .....	36.82	36.03	34.88	33.73	32.57	31.42	30.27	29.12	27.97	26.82	38.33	0.1151	$\pm 0.90$
Triethyl aconitate <sup>d</sup> .....	35.57	34.56	33.54	32.52	31.50	30.49	29.47	28.45	27.44	26.42	36.59	0.1017	$\pm 0.03$
Isobutyl propionate <sup>i</sup> .....	27.80	26.64	25.47	24.31	23.14	21.97	20.81	19.64	18.48	17.31	28.97	0.1166	.....
Isobutyl isobutyrate <sup>i</sup> .....	29.65	28.38	27.11	25.84	24.57	23.30	22.03	20.76	19.49	18.22	30.92	0.1270	.....
Isopentyl propionate <sup>i</sup> .....	26.01	25.10	24.20	23.29	22.39	21.49	20.58	19.68	18.77	17.87	26.91	0.09039	.....

<sup>a</sup> Ref. [159] (Capillary Pressure-A) ( $\pm 0.1$ ).

<sup>b</sup> Ref. [49] (Maximum Bubble Pressure-A) ( $\pm 0.2$ ).

<sup>c</sup> Ref. [125] (V) ( $\pm 0.3$ ).

<sup>d</sup> Ref. [254] (A) ( $\pm 0.3$ ).

<sup>e</sup> Ref. [214, 82] (Calc.  $\gamma = 0.03849 - (437.1 - T)^{1.82}$ ).

<sup>f</sup> Ref. [95] (A) ( $\pm 0.3$ ).

<sup>g</sup> Ref. [132] (Drop Weight-A) ( $\pm 0.3$ ).

<sup>h</sup> Ref. [216] (Maximum Bubble Pressure-A) ( $\pm 0.4$ ).

<sup>i</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).

<sup>j</sup> Ref. [133] (Drop Weight-A) ( $\pm 0.4$ ).

<sup>k</sup> Ref. [262] (A) ( $\pm 0.4$ ).

<sup>l</sup> Ref. [193] (Cap. Rise-A) ( $\pm 0.6$ ).

TABLE 10. Aliphatic thiols and sulfides [248]

(Cap. Rise-A)

Compound	Surface tension ( $\pm 0.1$ )									Least squares constants		$\sigma_s$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Methanethiol <sup>a</sup> .....	25.55	24.70	23.00	21.31						28.09	0.1696	$\pm 0.02$
Ethaneithiol.....	23.87	23.47	22.68							25.06	0.0793	$\pm 0.10$
1-Propanethiol.....	25.47	24.84	23.56	22.29	21.02	19.75				27.38	0.1272	$\pm 0.05$
2-Propanethiol.....	22.50	21.91	20.74	19.56	18.39					24.26	0.1174	$\pm 0.00$
1-Butanethiol.....	26.36	25.79	24.64	23.50	22.36	21.22	20.08	18.93		28.07	0.1142	$\pm 0.04$
2-Methyl-1-propanethiol.....	24.52	24.01	22.99	21.96	20.94	19.92	18.89	17.87		26.06	0.1024	$\pm 0.16$
2-Methyl-2-propanethiol.....	21.05	20.51	19.43	18.34	17.26					22.68	0.1084	$\pm 0.00$
1-Pentanethiol.....	26.83	26.35	25.37	24.39	23.41	22.44	21.46	20.84	19.51	28.30	0.0977	$\pm 0.03$
3-Methyl-1-butanethiol.....	26.10	25.60	24.60	23.60	22.60	21.60	20.60	19.60	18.60	27.60	0.1000	$\pm 0.21$
1-Hexanethiol.....	27.92	27.50	26.53	25.56	24.59	23.63	22.66	21.69	20.73	29.43	0.0967	$\pm 0.03$
1-Heptanethiol.....	27.69	27.26	26.42	25.57	24.72	23.87	23.02	22.18	21.33	28.96	0.0848	$\pm 0.25$
1-Octanethiol.....	28.18	27.77	26.95	26.14	25.32	24.51	23.69	22.88	22.06	29.40	0.0815	$\pm 0.03$
Benzenethiol.....	39.61	39.01	37.80	36.60	35.40	34.20	33.00	31.79	30.59	41.41	0.1202	$\pm 0.09$
Methyl phenyl sulfide.....	40.95	40.33	39.10	37.86	36.62	35.38	34.14	32.91	31.67	42.81	0.1238	$\pm 0.03$
Ethyl phenyl sulfide.....	37.60	37.04	35.91	34.78	33.64	32.51	31.38	30.25	29.12	39.50	0.1131	$\pm 0.12$
Phenyl propyl sulfide.....	35.89	35.37	34.32	33.28	32.23	31.18	30.14	29.09	28.05	37.46	0.1046	$\pm 0.08$
Isopropyl phenyl sulfide.....	33.99	33.46	32.46	31.35	30.29	29.24	28.18	27.15	26.07	35.57	0.1055	$\pm 0.09$
Butyl phenyl sulfide.....	34.99	34.50	33.52	32.55	31.57	30.59	29.62	28.64	27.67	36.45	0.0976	$\pm 0.07$
1-Pentyl phenyl sulfide.....	34.63	34.16	33.26	32.25	31.30	30.35	29.40	28.44	27.49	36.06	0.0952	$\pm 0.13$
Hexyl phenyl sulfide.....	44.67	44.07	42.87	41.63	40.48	39.28	38.09	36.89	35.70	46.46	0.1196	$\pm 0.05$

<sup>a</sup> Ref. [13] (Capillary Rise Method) ( $\pm 1.5$ ).

TABLE II. Alicyclic hydrocarbons and derivatives [236]  
 (Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.1$ )										Least squares constants		$r^2$	
	5°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°C.	a		b
Cyclohexane <sup>a</sup>	27.13	26.43	25.24	24.06	22.87	21.68	20.49	19.30				27.62	0.1188	$\pm 0.01$
Cyclohexene <sup>a</sup>	28.62	28.01	26.78	25.56	24.34	23.11	21.89	20.67				29.23	0.1223	$\pm 0.01$
Cyclopentane <sup>a</sup>	24.80	23.34	22.61	21.14	19.68	18.22						23.53	0.1462	$\pm 0.01$
Cyclopentene <sup>a</sup>	25.19	24.44	22.95	21.45								25.94	0.1495	$\pm 0.01$
Cyclohexane <sup>c</sup>			29.84	28.75	27.66	26.57	25.48	24.39	23.30	22.21	21.12	32.02	0.1090	$\pm 0.05$
Cyclopentanol <sup>a</sup>			33.02	32.01	31.00	29.98	28.97	27.96	26.95	25.94	24.93	35.04	0.1011	$\pm 0.01$
Cyclohexanol <sup>a</sup>			33.40	32.43	31.47	30.50	29.53	28.57	27.60	26.64	25.67	35.33	0.0966	$\pm 0.01$
Cycloheptanol	35.16	34.70	33.17	32.25	31.33	30.40	29.48	28.56	27.64	26.71	25.79	35.02	0.0923	$\pm 0.18$
Cycloheptanone	35.00	34.45	33.35	32.25	31.15	30.05	28.95	27.85	26.75	25.65	24.55	35.53	0.1100	$\pm 0.05$
Cyclohexanone	37.05	36.43	35.19	33.94	32.70	31.46	30.22	28.98	27.73	26.49	25.25	37.67	0.1242	$\pm 0.25$
Cycloheptanone	36.23	35.71	34.66	33.61	32.56	31.50	30.45	29.40	28.35	27.30	26.25	36.76	0.1051	$\pm 0.11$
Methylcyclopentane		23.47	22.30	21.11	19.98	18.81	17.65					24.63	0.1163	$\pm 0.12$
1-Methylcyclopentene <sup>b</sup>	21.20	20.64	19.52									21.76	0.1120	$\pm 0.05$
Methylcyclohexane <sup>a</sup>	25.54	24.98	23.85	22.72	21.59	20.46	19.33					26.11	0.1130	$\pm 0.02$
Ethylcyclopentane <sup>a</sup>	25.41	24.90	23.88	22.86	21.84	20.82	19.80					25.92	0.1020	$\pm 0.01$
Propylcyclopentane <sup>b</sup>	26.42	25.83	24.95	23.97	22.99	22.01	21.03					26.91	0.09795	$\pm 0.01$
Isopropylcyclopentane <sup>b</sup>	25.85	25.36	24.38	23.40	22.42	21.44	20.46					26.34	0.09795	$\pm 0.01$
Butylcyclopentane <sup>b</sup>	27.31	26.83	25.87	24.91	23.95	22.99	22.03					27.79	0.09660	$\pm 0.01$
Isobutylcyclopentane <sup>b</sup>	26.13	25.67	24.75	23.84	22.91	21.99	21.08					26.59	0.0919	$\pm 0.01$
Propylcyclohexane <sup>b</sup>	27.86	27.35	26.33	25.31	24.29	23.27	22.25					28.37	0.1020	$\pm 0.02$
Isopropylcyclohexane <sup>b</sup>	27.98	27.48	26.48	25.50	24.49	23.50	22.51					28.48	0.0995	$\pm 0.08$
Butylcyclohexane <sup>b</sup>	28.48	27.99	27.03	26.02	25.09	24.11	23.14					28.96	0.09697	$\pm 0.02$
Isobutylcyclohexane <sup>b</sup>	27.29	26.80	25.84	24.87	23.91	22.94	21.98					27.77	0.0965	$\pm 0.01$
sec-Butylcyclohexane <sup>b</sup>	28.88	28.41	27.46	26.52	25.56	24.61	23.66					29.36	0.09550	$\pm 0.01$
tert-Butylcyclohexane <sup>b</sup>	28.10	27.62	26.66	25.71	24.74	23.78	22.82					28.58	0.09593	$\pm 0.01$
Cyclo-octanone <sup>c</sup>					34.03	33.02	32.02	31.02	30.02	29.01	28.01	38.04	0.1003	$\pm 0.01$
1-Methylcyclohexene <sup>a</sup>		27.70	26.60	25.49	24.38	23.27	22.17	21.06	19.95	18.85	17.74	28.81	0.1107	$\pm 0.09$
Methylenecyclopentane		25.42	24.35	23.29	22.23							26.48	0.1063	$\pm 0.01$
3-Methylcyclopentene	24.48	23.88	22.68	21.48								23.08	0.1200	$\pm 0.01$
1,1-Dimethylcyclohexane <sup>a</sup>	25.59	25.11	24.13	23.16	22.18	21.21	20.24					26.08	0.0974	$\pm 0.05$
cis-1,2-Dimethylcyclohexane <sup>a</sup>	27.31	26.79	25.73	24.68	23.62	22.56	21.50					27.85	0.1058	$\pm 0.02$
trans-1,2-Dimethylcyclohexane <sup>a</sup>	25.45	24.98	24.04	23.10	22.16	21.21	20.27					25.92	0.0941	$\pm 0.05$
cis-1,3-Dimethylcyclohexane <sup>a</sup>	24.56	24.08	23.63	22.15	21.19	20.23	19.27					25.04	0.0962	$\pm 0.02$
trans-1,3-Dimethylcyclohexane <sup>a</sup>	26.20	25.69	24.67	23.66	22.64	21.62	20.60					26.71	0.1018	$\pm 0.01$
cis-1,4-Dimethylcyclohexane <sup>a</sup>	25.87	25.39	24.43	23.47	22.51	21.54	20.58					26.35	0.0961	$\pm 0.02$
trans-1,4-Dimethylcyclohexane <sup>a</sup>	21.47	23.98	33.01	22.03	21.06	20.08	19.10					24.96	0.0976	$\pm 0.02$
trans-Hexahydro-2-indanone			30.81	29.91	28.99	28.07	27.15	26.23	25.30	24.40	23.46	32.68	0.0922	$\pm 0.03$
trans-Decahydro-2-methylenenaphthalene	36.43	35.96										36.89	0.0922	$\pm 0.03$
trans-Hexahydro-2-methylenecyclohexane			28.85	27.93	27.02	26.10	25.18	24.27	23.35	22.44	21.52	30.68	0.0916	$\pm 0.05$

1,1-Dimethylcyclopentane <sup>e</sup>	23.27	22.76	21.75	20.73	19.72	18.70	17.68	26.87	25.48	24.82	23.79	23.78	0.1016	±0.02
2-Methylcyclohexanone <sup>e</sup>	33.55	33.03	32.01	30.98	29.95	28.92	27.90	26.58	25.48	24.73	23.81	23.06	0.1027	±0.03
3-Methylcyclohexanone <sup>e</sup>	32.60	32.13	31.21	30.28	29.36	28.43	27.51	26.58	25.66	24.73	23.81	23.06	0.0925	±0.16
4-Methylcyclohexanone <sup>e</sup>	32.36	31.89	30.96	30.02	29.09	28.15	27.22	26.28	25.35	24.41	23.48	22.83	0.0935	±0.02
3-Methylcyclopentanone	31.18	30.69	29.72	28.75	27.78	26.81	25.85	24.88	23.91	22.94	21.97	21.66	0.0969	±0.03
Bromocycloheptane	35.30	34.42	33.53	32.64	31.75	30.87	29.98	29.08	28.21	27.32	26.44	25.56	0.0887	±0.20
1-Methylcyclopentanol <sup>b</sup>	29.29	28.94	28.24	27.54	26.84	26.14	25.44	24.74	24.04	23.34	22.64	21.94	0.0993	±0.04
3-Methylcyclopentanol	32.06	31.68	30.91	30.14	29.37	28.60	27.83	27.06	26.29	25.52	24.75	24.05	0.0700	±0.01
2-Methylcyclohexanol	28.77	28.45	27.82	27.19	26.56	25.93	25.31	24.68	24.05	23.42	22.79	22.16	0.0629	±0.01
3-Methylcyclohexanol	28.72	28.38	27.69	27.00	26.31	25.62	24.93	24.24	23.55	22.86	22.17	21.48	0.0690	±0.09
4-Methylcyclohexanol	30.67	30.22	29.34	28.45	27.57	26.68	25.80	24.91	24.02	23.14	22.25	21.36	0.08862	±0.01
Dodecylcyclopentane <sup>d</sup>	31.06	30.63	29.77	28.92	28.06	27.20	26.34	25.49	24.63	23.77	22.91	22.05	0.08579	±0.01
Dodecylcyclohexane <sup>d</sup>	26.20	25.70	24.72	23.73	22.75	21.76	20.78	19.79	18.81	17.82	16.84	15.86	0.1077	±0.02
Methylcyclohexane <sup>e</sup>	27.25	26.73	25.67	24.62	23.56	22.51	21.46	20.41	19.36	18.31	17.26	16.21	0.0985	±0.01
1-Methyl-3-methylcyclohexane	37.52	37.05	36.12	35.18	34.25	33.31	32.37	31.44	30.50	29.57	28.63	27.70	0.0929	±0.04
2-Cyclopentylcyclopentanol	33.26	32.66	31.99	31.32	30.65	29.98	29.31	28.64	27.97	27.30	26.63	25.96	0.1054	±0.04
trans-0-tetrahydro-2(1H)-naphthalenone	33.26	32.66	31.99	31.32	30.65	29.98	29.31	28.64	27.97	27.30	26.63	25.96	0.0936	±0.07
Methyl 2-methyl-1,1-cyclohexanediacetate	32.03	31.59	30.93	30.27	29.61	28.95	28.29	27.63	26.97	26.31	25.65	24.99	0.0981	±0.03
Ethyl 2-methyl-1,1-cyclohexanediacetate	34.59	33.72	32.84	31.97	31.10	30.22	29.35	28.47	27.60	26.73	25.86	25.00	0.0891	±0.01
Methylcyclopentadecane <sup>f</sup>	24.87	24.41	23.50	22.58	21.67	20.75	19.84	18.92	18.00	17.08	16.16	15.24	0.0840	±0.01
3-Methylcyclopentadecanone <sup>f</sup>	24.87	24.41	23.50	22.58	21.67	20.75	19.84	18.92	18.00	17.08	16.16	15.24	0.0874	±0.03
9-Cycloheptadecen-1-one <sup>f</sup>	24.87	24.41	23.50	22.58	21.67	20.75	19.84	18.92	18.00	17.08	16.16	15.24	0.0871	±0.05
1,1,3-Trimethylcyclohexane <sup>b</sup>	24.87	24.41	23.50	22.58	21.67	20.75	19.84	18.92	18.00	17.08	16.16	15.24	0.0915	±0.01

<sup>a</sup> Ref. [105] (Maximum Bubble Pressure-A).<sup>b</sup> Ref. [226] (A) (±0.10).<sup>c</sup> Ref. [38] (A) (±0.10).<sup>d</sup> Ref. [112] (N<sub>2</sub>) (±0.01).<sup>e</sup> Ref. [27] (A).<sup>f</sup> Ref. [187] (A).<sup>g</sup> Ref. [1] (A).<sup>h</sup> Ref. [182] (Maximum Bubble Pressure-A) (±0.03).

TABLE 12. Alkyl halides [237]

(Diff. Cap. Rise-A)

Compound	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_2$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Chloromethane <sup>a</sup>	17.6	16.2	14.6								19.5	0.1650	
Iodomethane	32.85	31.00	29.72	28.48							33.42	0.1234	
Bromoethane	25.36	24.20	23.04								26.52	0.1159	$\pm 0.02$
Iodoethane	30.38	29.16	27.81	26.53	25.24	23.95	22.67				31.67	0.1286	$\pm 0.13$
1-Chloropropane	23.16	21.92	20.67	19.43							24.41	0.1246	$\pm 0.07$
2-Chloropropane	20.49	19.60	18.72	17.84							21.37	0.0383	$\pm 0.05$
1-Bromopropane <sup>b</sup>	27.08	25.86	24.65	23.43	22.21	20.99					28.30	0.1218	$\pm 0.60$
2-Bromopropane <sup>b</sup>	25.03	23.84	22.66	21.48	20.29						26.21	0.1183	$\pm 0.50$
1-Iodopropane <sup>b</sup>	30.56	29.37	28.23	27.10	26.96	24.82	23.69	22.55	21.42	20.28	31.61	0.1136	$\pm 0.60$
2-Iodopropane <sup>b</sup>	28.24	27.14	26.03	24.92	23.81	22.71	21.60	20.49			29.35	0.1107	$\pm 0.50$
1-Chlorobutane	24.65	23.74	22.63	21.50	20.38	19.27	18.15				25.97	0.1117	$\pm 0.08$
1-Chloro-2-methylpropane	23.36	22.20	21.10	20.00	18.90	17.81					24.40	0.1099	$\pm 0.07$
2-Chlorobutane	23.28	22.16	21.05	19.93	18.81	17.69					24.40	0.1118	$\pm 0.06$
1-Bromobutane	27.58	26.46	25.33	24.21	23.08	21.95	20.83	19.70	18.58	17.45	28.71	0.1126	$\pm 0.05$
1-Bromo-2-methylpropane	25.90	24.84	23.78	22.72	21.66	20.61	19.55	18.49			26.96	0.1059	$\pm 0.03$
2-Bromobutane	26.37	25.27	24.16	23.05	21.94	20.84	19.73	18.62	17.52		27.48	0.1107	$\pm 0.03$
1-Iodobutane	29.79	28.76	27.73	26.70	25.66	24.63	23.60	22.57	21.54	20.51	30.82	0.1031	$\pm 0.07$
1-Iodo-2-methylpropane	29.19	28.12	27.04	25.97	24.90	23.83	22.76	21.68	20.61	19.54	30.26	0.1072	$\pm 0.10$
2-Iodobutane	29.26	28.23	27.15	26.10	25.04	23.98	22.93	21.87	20.82	19.76	30.32	0.1056	$\pm 0.08$
1-Fluoropentane	21.49	20.18	18.86	17.55	16.23	14.92					22.61	0.1315	$\pm 0.15$
1-Chloropentane	26.01	24.94	23.86	22.79	21.71	20.63	19.56	18.48	17.41	16.33	27.09	0.1076	$\pm 0.08$
1-Chloro-3-methylbutane	24.43	23.36	22.28	21.21	20.13	19.05	17.98	16.90	15.83		25.53	0.1076	$\pm 0.02$
1-Bromopentane	28.46	27.41	26.36	25.31	24.26	23.22	22.17	21.12	20.07	19.02	29.51	0.1019	$\pm 0.02$
1-Bromo-3-methylbutane <sup>b</sup>	27.10	26.11	25.11	24.12	23.12	22.12	21.15	20.13	19.14	18.14	26.10	0.09959	$\pm 0.06$
1-Iodopentane	30.40	29.58	28.87	27.35	26.34	25.33	24.31	23.30	22.28	21.27	31.41	0.1014	$\pm 0.04$
1-Iodo-3-methylbutane	29.46	28.54	27.63	26.71	25.80	24.83	23.97	23.05	22.14	21.22	30.37	0.09145	$\pm 0.03$
1-Fluorohexane	22.41	21.41	20.41	19.41	18.40	17.40	16.40				23.41	0.1001	$\pm 0.05$
1-Chlorohexane	27.28	26.24	25.21	24.17	23.13	22.09	21.05	20.02	18.98	17.94	28.32	0.1033	$\pm 0.06$
1-Bromohexane		27.88	26.91	25.94	24.98	24.01	23.04	22.07	21.11	20.14	29.81	0.09669	$\pm 0.10$
1-Iodohexane <sup>c</sup>		29.94	29.09	28.25	27.40	26.56	25.71	24.87	24.02	23.18	31.63	0.08454	$\pm 0.01$
1-Fluoroheptane <sup>c</sup>	23.85	22.82	21.80	20.77	19.74	18.71	17.63	16.66	15.63	14.60	24.88	0.1028	$\pm 0.04$
1-Chloroheptane	27.98	27.02	26.06	25.10	24.13	23.17	22.21	21.25	20.29	19.33	28.94	0.0961	$\pm 0.05$
1-Bromoheptane	29.76	28.78	27.79	26.81	25.83	24.85	23.87	22.88	22.40	20.92	30.75	0.0982	$\pm 0.08$
1-Iodoheptane <sup>d</sup>		30.41	29.52	28.63	27.75	26.86	25.97	25.09	24.20	23.31	32.18	0.08865	$\pm 0.03$
1-Fluoro-octane <sup>c</sup>	24.97	24.03	23.10	22.16	21.22	20.28	19.34	18.41	17.47	16.53	25.91	0.0933	$\pm 0.08$
1-Chloro-octane	28.68	27.72	26.76	25.80	24.83	23.87	22.91	21.95	20.99	20.03	29.64	0.0961	$\pm 0.08$
2-Chloro-octane <sup>c</sup>		27.40	26.40	25.40	24.40	23.40	22.40				28.40	0.1000	$\pm 0.10$
1-Bromo-octane	50.07	29.14	28.22	27.29	26.36	25.43	24.50	23.58	22.65	21.72	31.00	0.0928	$\pm 0.04$
1-Iodo-octane	31.60	30.68	29.77	28.85	27.94	27.02	26.11	25.19	24.28		32.51	0.09146	$\pm 0.07$
1-Chlorononane	29.29	28.34	27.38	26.43	25.48	24.53	23.58	22.62	21.67	20.72	30.24	0.0952	$\pm 0.10$
1-Bromononane	30.47	29.57	28.68	27.78	26.89	26.00	25.10	24.23	23.31	22.42	31.36	0.0894	$\pm 0.07$
1-Chlorodecane	29.82	28.89	27.95	27.02	26.08	25.14	24.21	23.27	22.34	21.40	30.76	0.0936	$\pm 0.01$
1-Bromodecane		29.55	28.69	27.84	26.98	26.13	25.28	24.41			31.26	0.0856	$\pm 0.07$
1-Chloroundecane		29.36	28.40	27.50	26.60	25.71	24.81	23.91	23.02	22.12	31.09	0.0897	$\pm 0.03$
1-Bromoundecane		30.22	29.36	28.50	27.63	26.77	25.91	25.05	24.19	23.33	31.94	0.0861	$\pm 0.05$
1-Bromododecane		30.83	29.94	29.06	28.18	27.30	26.42	25.53	24.65	23.77	32.59	0.08819	$\pm 0.05$
1-Bromotetradecane <sup>c</sup>	32.05	31.17	30.30	29.42	28.54	27.66	26.78	25.91	25.03	24.15	32.93	0.0878	$\pm 0.08$
1-Chlorohexadecane <sup>c</sup>	32.10	31.10	30.10	29.10							33.10	0.1000	$\pm 0.10$

TABLE 12. Alkyl halides [237]—Continued

Compound	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
1-Bromohexadecane <sup>e</sup>	32.15	31.65	30.79	29.93	29.06	28.20	27.34	26.48	25.62	24.76	33.37	0.0861	$\pm 0.05$
1-Bromo-2-ethoxyethane <sup>e</sup>	30.85	29.72	28.59	27.46	26.33	25.21	24.08	22.95	21.82	-----	31.98	0.1129	$\pm 0.05$
1-Iodohexadecane <sup>f</sup>	-----	32.73	31.85	30.97	30.09	29.21	28.33	27.45	26.57	25.69	34.49	0.0880	$\pm 0.04$

<sup>a</sup> Ref. [232] (V).<sup>b</sup> Ref. [192] (A).<sup>c</sup> Ref. [243] (A).<sup>d</sup> Ref. [91] (A).<sup>e</sup> Ref. [157] (A).<sup>f</sup> Ref. [42] (A) ( $\pm 0.15$ ).TABLE 13. Polyalkanes  
(Differential Capillary Rise-A)

Compound	Surface tension										Least squares constants		$\sigma_{\gamma}$
	15°	25°	35°	45°	55°	65°	75°	85°	95°	105 °C	a	b	
1,1,2,2-Tetrachloroethane <sup>b</sup>	36.85	35.58	34.41	33.04	31.78	30.51	29.24	27.97	26.70	25.44	38.75	0.1268	$\pm 0.12$
1,1,2,2-Tetrabromoethane <sup>b</sup>	50.18	48.71	47.25	45.79	44.32	42.86	41.40	39.93	38.47	-----	52.37	0.1463	$\pm 0.05$
1,1,1-Trichloroethane <sup>a</sup>	26.40	25.14	23.89	22.64	21.38	20.13	-----	-----	-----	-----	28.28	0.1242	$\pm 0.05$
1,2,3-Tribromopropane <sup>c</sup>	-----	44.82	43.56	42.29	41.02	39.75	38.49	37.22	35.95	34.69	47.99	0.1267	$\pm 0.12$
Bromodichloromethane <sup>b</sup>	33.17	31.87	30.58	29.29	27.99	26.70	25.40	24.11	-----	-----	35.11	0.1294	$\pm 0.05$
Chloroform <sup>c</sup>	27.97	26.67	25.38	24.08	22.79	21.49	20.20	-----	-----	-----	29.91	0.1295	$\pm 0.07$
Bromoform <sup>a</sup>	46.18	44.87	43.56	42.25	40.95	39.64	38.33	37.02	35.71	-----	48.14	0.1308	$\pm 0.27$
Carbon tetrachloride <sup>c</sup>	27.65	26.43	25.21	23.98	22.76	21.53	20.31	19.09	17.86	16.64	29.49	0.1224	$\pm 0.20$
Pentachloroethane <sup>d</sup>	35.32	34.14	32.97	31.79	30.61	29.43	28.25	27.08	-----	-----	37.09	0.1178	$\pm 0.02$
1,1,2-Trichloroethane <sup>c</sup>	35.37	34.02	32.67	31.32	29.97	28.62	27.27	25.92	24.57	23.21	37.40	0.1351	$\pm 0.70$

<sup>a</sup> Ref. [250] ( $\pm 0.10$ ).<sup>b</sup> Ref. [256] ( $\pm 0.3$ ).<sup>c</sup> Ref. calculated [230] (V), [82].<sup>d</sup> Ref. [91] ( $\pm 0.2$ ).<sup>e</sup> Ref. [192] ( $\pm 0.7$ ).

TABLE 14.1. Dialkyl oxalates [126]  
 (Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_1$
	20°	40°	60°	85 °C	a	b	
Dihexyl.....	30.45	28.74	27.02	24.88	32.16	0.0856	$\pm 0.01$
Diheptyl.....	31.29	29.51	27.84	24.87	33.20	0.0987	$\pm 0.03$

 TABLE 14.2. Alkyl isonicotinate [126]  
 (Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_1$
	20°	40°	60°	85 °C	a	b	
Methyl.....	40.83	38.49	36.12	33.18	43.19	0.1178	$\pm 0.01$
Ethyl.....	37.15	35.02	32.89	30.23	39.26	0.1065	$\pm 0.01$
Propyl.....	35.22	33.23	31.23	28.73	37.22	0.09984	$\pm 0.01$
Butyl.....	34.77	32.82	30.99	28.63	36.66	0.09444	$\pm 0.01$
Pentyl.....	33.92	32.24	30.55	28.45	35.60	0.0841	$\pm 0.02$
Hexyl.....	33.46	31.73	29.99	27.83	35.20	0.08676	$\pm 0.01$
Heptyl.....	33.81	32.00	30.20	27.94	35.62	0.0964	$\pm 0.02$

 TABLE 14.3. Methyl pyridyl ketones [126]  
 (Maximum Bubble Pressure-A)

Ketone	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_1$
	20°	40°	60°	85 °C	a	b	
2-Pyridyl.....	39.65	37.30	34.95	32.01	42.00	0.1175	$\pm 0.02$
3-Pyridyl.....	44.66	42.26	39.86	36.86	47.06	0.1200	$\pm 0.02$
4-Pyridyl.....	44.01	41.51	39.00	35.88	46.51	0.1251	$\pm 0.02$



TABLE 14.4. Alkyl picolates [126]  
 (Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_7$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....	43.48	41.31	39.15	36.43	45.64	0.1082	$\pm 0.01$
Ethyl.....	39.72	37.57	35.43	32.75	41.86	0.1072	$\pm 0.01$
Propyl.....	36.98	35.04	33.10	30.67	38.92	0.09697	$\pm 0.05$
Butyl.....	35.86	33.95	32.05	29.66	37.77	0.0954	$\pm 0.01$
Pentyl.....	34.62	32.90	31.17	29.03	36.34	0.0861	$\pm 0.01$
Hexyl.....	34.12	32.33	30.53	28.29	35.91	0.0896	$\pm 0.01$
Heptyl.....	33.35	31.65	29.96	27.84	35.04	0.0847	$\pm 0.03$

 TABLE 14.5. Alkyl nicotates [126]  
 (Maximum Bubble Pressure-A)

Ester	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_7$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....		39.03	36.66	33.72	43.77	0.1184	$\pm 0.00$
Ethyl.....	37.80	35.56	33.32	30.52	40.04	0.1120	$\pm 0.02$
Propyl.....	36.11	34.16	32.20	29.76	38.07	0.0978	$\pm 0.02$
Isopropyl.....	33.82	31.61	29.59	26.62	36.04	0.1108	$\pm 0.04$
Butyl.....	35.22	33.34	31.47	29.13	37.09	0.0936	$\pm 0.01$
sec-Butyl.....	34.42	32.00	29.58	26.56	36.83	0.1208	$\pm 0.40$
tert-Butyl.....	33.94	32.27	30.61	28.53	35.60	0.0832	$\pm 0.40$
Pentyl.....	34.23	32.57	30.91	28.83	35.89	0.0830	$\pm 0.06$
Hexyl.....	33.71	31.96	30.20	28.01	35.46	0.0876	$\pm 0.01$
Heptyl.....	33.28	31.59	29.88	27.77	34.98	0.0848	$\pm 0.00$

TABLE 14.6. Pyridine and alkylpyridines [126]  
 (Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_T$
	20°	40°	60°	85 °C	a	b	
Pyridine.....	37.21	34.60	31.98	28.72	39.82	0.1306	$\pm 0.30$
2-Methyl.....	33.62	31.14	28.65	25.54	36.11	0.1243	$\pm 0.04$
2-Ethyl.....	32.01	29.72	27.44	24.58	34.29	0.1142	$\pm 0.07$
2-Propyl.....	31.36	29.21	27.07	24.38	33.51	0.1074	$\pm 0.11$
2-Butyl.....	31.02	29.03	27.05	24.56	33.01	0.0994	$\pm 0.01$
2-Pentyl.....	30.98	29.02	27.06	24.61	32.94	0.0980	$\pm 0.01$
2-Hexyl.....	30.62	28.86	27.09	24.89	32.38	0.0881	$\pm 0.02$
2-Heptyl.....	30.84	29.14	27.44	25.30	32.55	0.0853	$\pm 0.03$
3-Methyl.....	35.04	32.74	30.43	27.55	37.35	0.1153	$\pm 0.02$
3-Ethyl.....	33.77	31.57	29.38	26.63	35.97	0.1099	$\pm 0.02$
3-Propyl.....	32.48	30.46	28.45	25.92	34.50	0.1009	$\pm 0.04$
3-Butyl.....	31.90	29.97	28.03	25.62	33.83	0.0966	$\pm 0.06$
3-Pentyl.....	31.61	29.78	27.96	25.68	33.43	0.0912	$\pm 0.01$
3-Hexyl.....	31.11	29.46	27.81	25.75	32.76	0.0825	$\pm 0.02$
3-Heptyl.....	31.25	29.57	27.89	25.79	32.93	0.0840	$\pm 0.01$
4-Methyl.....	35.43	33.15	30.86	28.01	37.71	0.1141	$\pm 0.02$
4-Ethyl.....	33.72	31.52	29.33	26.58	35.92	0.1099	$\pm 0.01$
4-Propyl.....	32.08	30.05	28.01	25.47	34.12	0.1018	$\pm 0.05$
4-Isopropyl.....	33.69	31.57	29.44	26.78	35.82	0.1063	$\pm 0.06$
4-Butyl.....	32.37	30.47	28.56	26.19	34.27	0.0951	$\pm 0.01$
4-sec-Butyl.....	34.71	32.76	30.80	28.36	36.66	0.0976	$\pm 0.01$
4-tert-Butyl.....	33.58	31.68	29.77	27.40	35.48	0.0951	$\pm 0.005$
4-Pentyl.....	32.41	30.45	28.48	26.03	34.37	0.0981	$\pm 0.05$
4-(1-Ethylpropyl).....	33.22	31.09	28.95	26.29	35.35	0.1066	$\pm 0.000$
4-Hexyl.....	31.66	30.07	28.49	26.51	33.24	0.0792	$\pm 0.01$
4-Heptyl.....	32.18	30.47	28.75	26.61	33.90	0.08575	$\pm 0.015$
4-(1-Propylbutyl).....	31.46	29.68	27.90	25.67	33.24	0.0890	$\pm 0.008$
4-(1-Hexylheptyl).....	31.27	29.54	27.82	25.67	32.99	0.0861	$\pm 0.000$
2,3-Dimethyl.....	33.24	31.10	28.97	26.29	35.38	0.1069	$\pm 0.02$
2,4-Dimethyl.....	33.16	30.76	28.37	25.38	35.55	0.1197	$\pm 0.04$
2,5-Dimethyl.....	32.31	30.05	27.78	24.96	34.57	0.1131	$\pm 0.02$
2,6-Dimethyl.....	31.59	29.27	26.96	24.06	33.91	0.1159	$\pm 0.11$
3,5-Dimethyl.....	33.82	31.66	29.49	26.79	35.98	0.1081	$\pm 0.03$
4-Ethyl-3-methyl.....	36.02	33.70	31.39	28.49	38.34	0.1159	$\pm 0.03$

TABLE 14.7. Alkyl orthogermanates [19]  
(Capillary Rise Method-A)

Ester	Surface tension ( $\pm 0.15$ )					Least squares constants	
	20°	25°	30°	35°	40 °C	a	b
Tetramethyl.....	22.89	22.49	22.08	21.68	21.27	24.51	0.0810
Tetraethyl.....	23.67	23.23	22.79	22.35	21.91	25.43	0.0880
Tetrapropyl.....	24.06	23.61	23.16	22.72	22.27	25.85	0.0895
Tetraisopropyl.....	21.17	20.76	20.35	19.95	19.54	22.80	0.0815
Tetrabutyl.....	24.45	24.00	23.54	23.09	22.64	26.26	0.0905
Tetraisobutyl.....	23.68	23.25	22.81	22.38	21.95	25.41	0.0865
Tetra-sec-butyl.....	23.93	23.47	23.00	22.53	22.07	25.79	0.0930
Tetra-tert-butyl.....	23.14	22.74	22.34	21.94	21.54	24.74	0.0800
Tetrapentyl.....	24.65	24.20	23.76	23.31	22.87	26.43	0.0890
Tetrakis(2,2-dimethylpropyl).....	23.86	23.39	22.93	22.44	21.96	25.75	0.0950

TABLE 15.1. 3-Methoxypropionates [2]  
(Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	30.83	28.49	26.15	23.22	33.17	0.1170
Ethyl.....	29.26	27.22	25.19	22.65	31.29	0.1017
Propyl.....	28.42	26.43	24.43	21.94	30.42	0.0998
Butyl.....	28.48	26.58	24.67	22.30	30.38	0.0951
Pentyl.....	28.59	26.75	24.90	22.59	30.44	0.0924
Hexyl.....	28.76	27.00	25.25	23.05	36.52	0.0879
Heptyl.....	28.86	27.24	25.61	23.59	30.43	0.0811

TABLE 15.3. 3-Propoxypropionates [2]  
(Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.26	26.37	24.47	22.09	30.16	0.0949
Ethyl.....	27.53	25.42	23.52	21.13	29.24	0.0954
Propyl.....	26.99	25.23	23.46	21.26	28.75	0.0881
Butyl.....	26.79	25.14	23.50	21.44	28.43	0.0822
Pentyl.....	27.10	25.51	23.93	21.95	28.68	0.0792
Hexyl.....	27.32	25.82	24.30	22.44	28.82	0.0751
Heptyl.....	27.88	26.29	24.71	22.72	29.47	0.0794

TABLE 15.2. 3-Ethoxypropionates [2]  
(Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.71	26.73	24.74	22.27	30.70	0.0993
Ethyl.....	27.84	25.89	23.93	21.49	29.79	0.0976
Propyl.....	27.25	25.38	23.50	21.16	29.12	0.0936
Butyl.....	26.78	25.10	23.43	21.33	28.46	0.0839
Pentyl.....	27.23	25.57	23.91	21.83	28.89	0.0832
Hexyl.....	27.63	26.00	24.36	22.32	29.26	0.0816
Heptyl.....	28.26	26.54	24.81	22.65	29.99	0.0863

TABLE 15.4. 3-Butoxypropionates [2]  
(Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.27	26.44	24.60	22.31	30.10	0.0916
Ethyl.....	27.23	25.44	23.64	21.40	29.03	0.0898
Propyl.....	27.11	25.39	23.66	21.51	28.83	0.0861
Butyl.....	26.76	25.19	23.63	21.67	28.33	0.0784
Pentyl.....	27.41	25.70	24.00	21.86	29.12	0.0854
Hexyl.....	27.74	26.16	24.55	22.56	29.34	0.0798
Heptyl.....	28.17	26.59	25.00	23.02	29.76	0.0793

TABLE 15.5. 3-Pentyloxypropionates [2]  
 (Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.37	26.59	24.82	22.60	30.14	0.0887
Ethyl.....	27.36	25.71	24.05	21.98	29.02	0.0828
Propyl.....	27.00	25.50	23.99	22.10	28.51	0.0754
Butyl.....	27.35	25.81	24.26	22.33	28.90	0.0773
Pentyl.....	27.68	26.10	24.51	22.54	29.26	0.0791
Hexyl.....	27.94	26.41	24.90	22.98	29.47	0.0763
Heptyl.....	28.34	26.77	25.21	23.25	29.90	0.0782

 TABLE 15.7. 3-Heptyloxypropionates [2]  
 (Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.33	26.68	25.03	22.98	29.98	0.0824
Ethyl.....	27.57	26.00	24.42	22.45	29.15	0.0788
Propyl.....	27.87	26.19	24.52	22.42	29.55	0.0839
Butyl.....	28.01	26.44	24.86	22.90	29.59	0.0788
Pentyl.....	28.32	26.89	25.47	23.68	29.75	0.0714
Hexyl.....	28.71	27.13	25.55	23.57	30.29	0.0790
Heptyl.....	28.77	27.44	26.11	24.45	30.10	0.0665

 TABLE 15.6. 3-Hexyloxypropionates [2]  
 (Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.54	26.83	25.14	23.01	30.23	0.0849
Ethyl.....	27.63	25.99	24.34	22.28	29.28	0.0823
Propyl.....	27.59	25.98	24.36	22.34	29.21	0.0808
Butyl.....	27.84	26.18	24.51	22.44	29.50	0.0831
Pentyl.....	28.20	26.55	24.90	22.84	29.85	0.0825
Hexyl.....	28.35	26.78	25.22	23.26	29.91	0.0782
Heptyl.....	28.41	27.03	25.66	23.93	29.79	0.0689

 TABLE 15.8. Butoxyacetates [2]  
 (Maximum Bubble Pressure Method-A)

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	a	b
Methyl.....	28.12	26.13	24.15	21.66	30.11	0.0994
Ethyl.....	27.39	25.55	23.72	21.42	29.23	0.0919
Propyl.....	27.40	25.63	23.87	21.66	29.16	0.0882
Butyl.....	27.13	25.48	23.83	21.77	28.78	0.0825
Pentyl.....	27.41	25.76	24.12	22.06	29.06	0.0824
Hexyl.....	27.59	25.98	24.38	22.37	29.19	0.0802
Heptyl.....	27.75	26.16	24.56	22.57	29.34	0.0796

 TABLE 16. Alkanesulfonyl chlorides [176]  
 (Capillary Rise Method-A)

Sulfonyl chloride	Surface tension ( $\pm 0.1$ )							Least squares constants	
	20°	25°	30°	35°	40°	45°	50 °C	a	b
Ethane.....	41.1	40.5	39.9	39.3	38.7	38.1	37.5	43.43	0.1177
1-Propane.....	38.0	37.5	36.9	36.4	35.8	35.3	34.8	40.14	0.1074
1-Butane.....	35.4	34.9	34.4	33.9	33.4	32.9	32.4	37.33	0.0977
1-Pentane.....	33.1	32.6	32.2	31.7	31.3	30.8	30.4	34.90	0.0909
1-Hexane.....	31.1	30.7	30.3	29.8	29.4	29.0	28.6	32.80	0.0849

TABLE 17.1. Alkanesulfonic acids [14]  
(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 1.5$ )							Least squares constants	
	18°	25°	35°	45°	55°	65°	75 °C	<i>a</i>	<i>b</i>
Methanesulfonic acid.....		50.05	49.15	48.26	47.37	46.48	45.58	52.28	0.0893
Ethanesulfonic acid.....	44.26	43.68	42.86	42.03	41.21	40.38	39.56	45.74	0.08239

TABLE 17.2. Alkyl thiosulfites [227]  
(Max. Bubble Pressure-A)

Thiosulfite	Surface tension ( $\pm 0.10$ )					Least squares constants	
	18°	20°	22°	24°	26 °C	<i>a</i>	<i>b</i>
Methyl.....	32.88	32.76	32.64	32.52	32.39	33.99	0.0614
Ethyl.....	30.56	30.27	29.97	29.68	29.39	33.21	0.1471
Propyl.....	29.78	29.60	29.42	29.34	29.07	31.37	0.0886
Butyl.....	29.47	29.28	29.10	28.91	28.72	31.14	0.0929

TABLE 17.3. Alkyl sulfates [237]  
(Capillary Rise Method-A)

Sulfate	Surface tension ( $\pm 0.10$ )											Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90°	100°	120 °C	<i>a</i>	<i>b</i>	
Methyl.....	39.52	38.93	37.76	36.61	35.44	34.28	33.12	31.96	30.79			41.26	0.1163	$\pm 0.08$
Ethyl.....	34.01	33.52	32.54	31.57	30.59	29.61	28.64	27.66	26.69	25.71	23.76	35.47	0.0976	$\pm 0.04$
Propyl.....	32.49	32.03	31.11	30.19	29.27	28.35	27.43	26.51	25.59	24.67	22.83	33.87	0.0920	$\pm 0.09$
Butyl.....	31.59	31.15	30.27	29.40	28.52	27.64	26.77	25.89	25.02	24.14	22.39	32.90	0.0876	$\pm 0.11$

TABLE 17.4. Alkyl sulfides [237]  
(Capillary Rise Method-A)

Sulfide	Surface tension ( $\pm 0.10$ )											Least squares constants		$\sigma_1$	
	Surface tension ( $\pm 0.10$ )											$a$	$b$		
	5°	10°	15°	20°	30°	40°	50°	60°	70°	80°	90°				100°
Methyl	25.26	24.86	24.46	24.01	22.91	21.80	20.69	19.04	17.34	16.36	15.08	13.11	26.07	0.0805	$\pm 0.07$
Ethyl	26.22	25.67	25.12	24.57	23.42	22.27	21.11	19.94	18.76	17.57	16.38	15.19	27.33	0.1106	$\pm 0.01$
Propyl	24.16	23.61	23.06	22.51	21.36	20.20	19.04	17.87	16.70	15.53	14.36	13.19	28.36	0.1035	$\pm 0.11$
Isopropyl	27.69	27.23	26.77	26.30	25.14	23.98	22.81	21.64	20.47	19.30	18.13	16.96	25.13	0.0974	$\pm 0.11$
Butyl	25.36	24.91	24.45	23.99	22.83	21.67	20.50	19.33	18.16	16.99	15.82	14.65	29.08	0.0925	$\pm 0.02$
Isobutyl	26.77	26.29	25.81	25.33	24.16	22.99	21.82	20.65	19.48	18.31	17.14	15.97	26.71	0.0899	$\pm 0.08$
sec-Butyl	28.24	27.80	27.35	26.89	25.72	24.55	23.38	22.21	21.04	19.87	18.70	17.53	27.73	0.0962	$\pm 0.04$
1-Pentyl	26.38	25.97	25.55	25.13	23.96	22.79	21.62	20.45	19.28	18.11	16.94	15.77	29.55	0.0876	$\pm 0.04$
Isopentyl	29.32	28.84	28.36	27.88	26.71	25.54	24.37	23.20	22.03	20.86	19.69	18.52	27.62	0.0824	$\pm 0.09$
Hexyl	26.99	26.54	26.08	25.62	24.45	23.28	22.11	20.94	19.77	18.60	17.43	16.26	30.09	0.0840	$\pm 0.03$
Heptyl	26.34	25.70	25.06	24.42	23.25	22.08	20.91	19.74	18.57	17.40	16.23	15.06	30.94	0.0811	$\pm 0.02$
Octyl	26.99	26.34	25.69	25.04	23.87	22.70	21.53	20.36	19.19	18.02	16.85	15.68	32.13	0.0938	$\pm 0.26$
Ethyl methyl	26.99	26.34	25.69	25.04	23.87	22.70	21.53	20.36	19.19	18.02	16.85	15.68	27.63	0.1286	$\pm 0.12$
Butyl methyl	26.23	25.19	24.15	23.11	21.94	20.77	19.60	18.43	17.26	16.09	14.92	13.75	28.31	0.1040	$\pm 0.03$
Isobutyl methyl	25.07	24.06	23.05	22.04	20.87	19.70	18.53	17.36	16.19	15.02	13.85	12.68	27.09	0.1010	$\pm 0.02$
tert-Butyl methyl	24.00	23.48	22.96	22.44	21.27	20.10	18.93	17.76	16.59	15.42	14.25	13.08	25.55	0.1035	$\pm 0.00$
Butyl ethyl	26.97	26.47	25.96	25.45	24.28	23.11	21.94	20.77	19.60	18.43	17.26	16.09	28.49	0.1010	$\pm 0.03$
tert-Butyl ethyl	23.54	22.58	21.63	20.67	19.50	18.33	17.16	15.99	14.82	13.65	12.48	11.31	25.45	0.0955	$\pm 0.04$

TABLE 17.4. Alkyl sulfides [237]—Continued

Compound	Surface tension ( $\pm 0.1$ )			Least squares constants	
	Surface tension ( $\pm 0.1$ )			$a$	$b$
	20°	25°	30 °C		
Dipropyl sulfide <sup>a</sup>	26.1	25.6	25.0	28.2	0.1050
Dibutyl sulfide <sup>a</sup>	27.1	26.7	26.2	28.8	0.0850

<sup>a</sup> Max. Bubble Pressure-A. Ref. [153].

TABLE 17.5. Alkyl disulfides [237]  
 (Capillary Rise Method-A)

Disulfide	Surface tension ( $\pm 0.10$ )											Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90°	100°	120 °C	a	b	
Methyl.....	34.74	34.06	32.72	31.38	30.03	28.69	-----	-----	-----	-----	-----	36.75	0.1343	$\pm 0.02$
Ethyl.....	31.43	30.91	29.87	28.83	27.79	26.76	25.72	24.68	23.64	-----	-----	32.99	0.1039	$\pm 0.06$
Propyl.....	31.03	30.53	29.53	28.53	27.53	26.54	25.54	24.54	23.54	-----	-----	32.53	0.0999	$\pm 0.09$
Isopropyl.....	28.84	28.37	27.42	26.48	25.53	24.58	23.64	22.69	21.75	-----	-----	30.26	0.0946	$\pm 0.15$
Butyl.....	31.02	30.55	29.62	28.68	27.75	26.82	25.88	24.95	24.01	-----	-----	32.42	0.0934	$\pm 0.07$
Isobutyl.....	28.41	27.97	27.10	26.22	25.35	24.48	23.60	22.73	21.85	-----	-----	29.72	0.0874	$\pm 0.06$
tert-Butyl.....	28.01	27.51	26.50	25.50	24.50	23.50	22.50	21.49	20.49	-----	-----	29.51	0.1002	$\pm 0.35$
1-Pentyl.....	30.01	29.61	28.80	27.99	27.18	26.37	25.56	24.75	23.94	23.13	21.51	31.23	0.0810	$\pm 0.09$
Isopentyl.....	28.87	28.46	27.64	26.83	26.01	25.19	24.38	23.56	22.75	21.93	20.30	30.09	0.0816	$\pm 0.10$

 TABLE 17.6. Alkyl sulfites [237]  
 (Capillary Rise Method-A)

Sulfite	Surface tension ( $\pm 0.10$ )											Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90°	100°	120 °C	a	b	
Methyl.....	34.60	33.97	32.72	31.47	30.21	28.96	27.71	26.46	25.20	-----	-----	36.48	0.1253	$\pm 0.05$
Ethyl.....	-----	29.58	28.50	27.42	26.33	25.25	24.17	23.09	22.00	-----	-----	31.75	0.1083	$\pm 0.06$
Propyl.....	29.16	28.69	27.77	26.84	25.91	24.98	24.05	23.13	22.20	21.27	19.41	30.55	0.0928	$\pm 0.07$
Isopropyl.....	26.59	26.14	25.24	24.34	23.44	22.55	21.65	20.75	19.85	18.95	17.15	27.94	0.0899	$\pm 0.10$
Butyl.....	29.26	28.81	27.91	27.01	26.11	25.22	24.32	23.42	22.52	-----	-----	30.61	0.0899	$\pm 0.06$
Isobutyl.....	27.53	27.10	26.22	25.34	24.46	23.59	22.71	21.83	20.96	20.08	18.33	28.85	0.0877	$\pm 0.07$
1-Pentyl.....	29.34	28.92	28.09	27.25	26.41	25.57	24.73	23.90	23.06	22.22	20.54	30.60	0.0838	$\pm 0.10$
Isopentyl.....	28.29	27.86	26.99	26.13	25.27	24.41	23.55	22.68	21.82	-----	-----	29.58	0.0862	$\pm 0.06$

 TABLE 17.7. Methyl sulfoxide [34]  
 (Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.20$ )								Least squares constants	
20°	25°	30°	35°	40°	50°	60 °C	a	b	
43.54	42.86	42.41	41.73	41.17	40.05	38.94	45.78	0.1145	

TABLE 18. Amides [228]

(Diff. Cap. Rise)

Compound	Surface tension ( $\pm 0.5$ )							Least squares constants		$\sigma_7$
	25°	45°	65°	85°	100°	110°	120° C	<i>a</i>	<i>b</i>	
Formamide <sup>a</sup> .....	57.02	55.34	53.66	51.97	50.71	49.87	49.03	59.13	0.0842	$\pm 0.05$
Acetamide.....				38.98	37.45	36.43	35.41	47.66	0.1021	$\pm 0.02$
Propionamide.....				31.32	29.96	29.05	28.14	39.05	0.0909	$\pm 0.01$
Lactamide.....				43.73	42.52	41.72	40.92	50.56	0.08035	$\pm 0.01$

Compound	Surface tension ( $\pm 0.5$ )						Least squares constants		$\sigma_7$
	130°	140°	150°	160°	170°	180 °C	<i>a</i>	<i>b</i>	
Benzamide.....	38.09	37.39	36.69	35.98	35.27	34.57	47.26	0.0705	$\pm 0.10$
<i>o</i> -Hydroxybenzamide.....		40.81	40.02	39.23	38.44	37.65	51.87	0.0790	$\pm 0.04$
2-Phenylacetamide.....				33.65	32.86	32.08	46.26	0.0788	$\pm 0.02$

<sup>a</sup> Ref. [157] (A) ( $\pm 0.2$ ).

TABLE 19.1. Isopropylamine [108]

(Maximum Bubble Pressure-N<sub>2</sub>)

Surface tension ( $\pm 2.0$ )										Least squares constants		$\sigma_7$
-70°	-60°	-50°	-40°	-30°	-20°	-10°	10°	20°	30 °C	<i>a</i>	<i>b</i>	
26.71	25.74	24.77	23.80	22.83	21.85	20.88	18.94	17.97	16.99	19.91	0.09719	$\pm 0.80$



TABLE 19.2. Primary, secondary, and tertiary amines [249]

(Diff. Cap. Rise-A)

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>	
Methylamine <sup>a</sup>	20.64	19.89	18.41	16.92						22.87	0.1488	$\pm 0.15$
Dimethylamine <sup>a</sup>	27.61	26.97	25.70	24.44						29.50	0.1265	$\pm 0.15$
Trimethylamine <sup>a</sup>	14.55	13.97	12.84	11.71						16.24	0.1133	$\pm 0.15$
Ethylamine <sup>a</sup>	20.57	19.89	18.51	17.14						22.63	0.1372	$\pm 0.15$
Diethylamine	21.00	20.42	19.28	18.14						22.71	0.1143	$\pm 0.09$
Triethylamine		20.72	19.72	18.73	17.74	16.75				22.70	0.0992	$\pm 0.03$
Propylamine	23.00	22.37	21.13	19.89						24.86	0.1243	$\pm 0.15$
Dipropylamine	23.33	22.82	21.79	20.77	19.75	18.73	17.71	16.68	15.66	24.86	0.1022	$\pm 0.07$
Diisopropylamine	20.21	19.68	18.60	17.52	16.44	15.37				21.83	0.1077	$\pm 0.07$
Tripropylamine		22.82	21.95	21.07	20.19	19.31	18.43	17.56	16.68	24.58	0.0878	$\pm 0.04$
Butylamine	24.56	24.00	22.87	21.75	20.63	19.51				26.24	0.1122	$\pm 0.05$
Isobutylamine		22.30	21.20	20.11	19.02	17.93				24.48	0.1092	$\pm 0.06$
sec-Butylamine		21.64	20.58	19.52						23.75	0.1057	$\pm 0.04$
tert-Butylamine <sup>c</sup>	17.90	17.38	16.36	15.33						19.44	0.1028	$\pm 0.02$
Dibutylamine	25.07	24.60	23.64	22.69	21.74	20.79	19.84	18.88	17.93	26.50	0.0952	$\pm 0.03$
Diisobutylamine	22.63	22.18	21.26	20.35	19.44	18.53	17.62	16.70	15.79	24.00	0.0912	$\pm 0.06$
Di-sec-butylamine	23.20	22.70	21.70	20.70	19.70	18.70				24.70	0.0999	$\pm 0.04$
Tributylamine		24.81	23.98	23.15	22.31	21.48	20.65	19.82	18.99	26.47	0.0831	$\pm 0.04$
Triisobutylamine <sup>c</sup>	22.61	22.30	21.68	21.06	20.44	19.83	19.21	18.59	17.97	23.54	0.0619	$\pm 0.09$
Pentylamine		25.20	24.18	23.16	22.13	21.11	20.09	19.07	18.04	27.25	0.1023	$\pm 0.03$
Isopentylamine		23.81	22.81	21.81	20.80	19.80	18.80	17.79	16.79	25.81	0.1002	$\pm 0.06$
tert-Pentylamine <sup>c</sup>	20.78	20.34	19.48	18.61	17.74	16.87	16.01			22.08	0.08676	$\pm 0.34$
Dipentylamine	26.59	26.15	25.26	24.38	23.50	22.62	21.74	20.85	19.97	27.91	0.0882	$\pm 0.11$
Diisopentylamine	24.75	24.32	23.47	22.61	21.75	20.89	20.04	19.18	18.32	26.04	0.08575	$\pm 0.10$
Tripentylamine	26.67	26.24	25.39	24.54	23.69	22.85	22.00	21.15	20.30	27.94	0.0849	$\pm 0.06$
Triisopentylamine	24.75	24.34	23.52	22.70	21.88	21.07	20.25	19.43	18.61	25.98	0.0819	$\pm 0.07$
Allylamine		24.92	23.63	22.34						27.49	0.1287	$\pm 0.06$
Hexylamine	26.76	26.26	25.24	24.22	23.20	22.19	21.17	20.15	19.14	28.29	0.1017	$\pm 0.05$
Isohexylamine <sup>c</sup>	23.77	23.39	22.64	21.89	21.14	20.38	19.63	18.88	18.13	24.90	0.07527	$\pm 0.10$
Dihexylamine <sup>i</sup>		27.45	26.55	25.66	24.76	23.87	22.97	22.07	21.18	29.24	0.08957	$\pm 0.10$
Heptylamine	24.79	24.39	23.61	22.93	22.05	21.26	20.48	19.70	18.91	25.96	0.07828	$\pm 0.13$
Ethylenediamine		41.97	40.58	39.18	37.78	36.38	34.98	33.59	32.19	44.77	0.1398	$\pm 0.02$
Cyclohexylamine	32.41	31.81	30.63	29.44	28.25	27.06	25.87	24.69	23.50	34.19	0.1188	$\pm 0.07$
Dicyclohexylamine	34.23	33.74	32.77	31.80	30.82	29.85	28.88	27.91	26.93	35.69	0.0973	$\pm 0.05$
Benzylamine		39.90	38.69	37.48	36.26	35.05	33.84	32.63	31.41	42.33	0.1213	$\pm 0.05$
Dibenzylamine <sup>g</sup>	41.64	41.10	40.01	38.93	37.84	36.75	35.67	34.58	33.50	43.27	0.1086	$\pm 0.08$
Ethyl methylcarbamate		32.48	31.47	30.48	29.47	28.47	27.47	26.46	25.46	34.48	0.1002	$\pm 0.90$
N-Nitrosodimethylamine <sup>c</sup>	38.98	38.36	37.12	35.88	34.64	33.41	32.17	30.93	29.69	40.84	0.1239	$\pm 0.07$
N-Nitrosodiethylamine <sup>c</sup>	33.58	33.07	32.05	31.03	30.00	28.98	27.96	26.94	25.92	35.11	0.1021	$\pm 0.07$
N-Nitrosodipropylamine <sup>c</sup>		31.64	30.67	29.70	28.72	27.75	26.78	25.81	24.83	33.59	0.0973	$\pm 0.05$
N-Nitrosodibutylamine <sup>c</sup>	30.79	30.36	29.49	28.62	27.75	26.89	26.02	25.15	24.29	32.09	0.0867	$\pm 0.01$
N-Nitrosodipentylamine <sup>i</sup>	30.66	30.24	29.41	28.58	27.74	26.91	26.08	25.24	24.41	31.91	0.08332	$\pm 0.08$
N-Nitrosodihexylamine <sup>i</sup>	30.47	30.07	29.22	28.40	27.57	26.74	25.91	25.08	24.25	31.71	0.08287	$\pm 0.04$
N,N-Diethylbenzylamine	30.26	29.79	28.87	27.95	27.02	26.10	25.18	24.26	23.33	31.64	0.0923	$\pm 0.13$
Aniline <sup>b, f, h, j</sup>	43.21	42.67	41.56	40.50	39.41	38.33	37.24	36.15	35.06	44.83	0.1085	
o-Toluidine <sup>f</sup>	41.23	40.68	39.59	38.49	37.40	36.31	35.21	34.12	33.02	42.87	0.1094	$\pm 0.07$
m-Toluidine <sup>f</sup>		38.37	37.39	36.41	35.43	34.46	33.48	32.50	31.52	40.33	0.0979	$\pm 0.11$
p-Toluidine <sup>f</sup>					34.79	33.84	32.88	31.92	30.97	39.58	0.0957	$\pm 0.08$
N-Methylaniline <sup>e</sup>	37.87	37.38	36.41	35.44	34.47	33.50	32.53	31.56	30.59	39.32	0.09698	$\pm 0.17$
N-Ethylaniline		36.86	35.79	34.72	33.65	32.58	31.51	30.44	29.37	39.00	0.1070	$\pm 0.06$
N-Propylaniline		34.79	33.84	32.89	31.94	31.00	30.05	29.10	28.15	36.69	0.0949	$\pm 0.05$
N-Butylaniline		33.91	33.04	32.17	31.29	30.42	29.55	28.68	27.81	35.65	0.0871	$\pm 0.07$
N,N-Dimethylaniline		36.04	34.99	33.94	32.89	31.85	30.80	29.75	28.70	38.14	0.1049	$\pm 0.07$
N,N-Diethylaniline		34.51	33.47	32.43	31.39	30.35	29.31	28.27	27.23	36.59	0.1040	$\pm 0.01$
N,N-Dipropylaniline		32.92	31.95	30.98	30.01	29.04	28.07	27.10	26.13	34.86	0.0970	$\pm 0.09$
N,N-Dibutylaniline	32.77	32.30	31.36	30.43	29.49	28.55	27.62	26.68	25.75	34.17	0.0936	$\pm 0.07$

TABLE 19.2. Primary, secondary, and tertiary amines [249]—Continued

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>	
<i>N,N</i> -Diisobutylaniline <sup>e</sup> .....	31.18	30.75	29.89	29.03	28.16	27.30	26.44	25.58	24.72	32.47	0.0861	$\pm 0.40$
Phenylhydrazine <sup>d</sup> .....	45.56	44.26	42.97	41.68	40.39	39.10	37.80	36.51	35.21	48.14	0.1292	$\pm 0.04$
<i>o</i> -Chloroaniline <sup>e</sup> .....	42.05	41.60	40.70	39.79	38.89	37.99	37.08	36.18	35.27	43.41	0.0904	$\pm 0.50$
<i>N</i> -Methyl- <i>N</i> -nitrosoaniline <sup>b</sup> .....	45.70	45.12	43.96	42.80	41.63	40.47	39.31	38.15	36.99	47.44	0.1161	$\pm 0.06$
<i>N</i> -Ethyl- <i>N</i> -nitrosoaniline.....	41.71	41.20	40.16	39.13	38.10	37.07	36.04	35.00	33.97	43.26	0.1032	$\pm 0.21$
<i>N</i> -Nitrosobenzylamine <sup>c</sup> .....	45.55	44.94	43.74	42.54	41.33	40.13	38.93	37.73	36.52	47.35	0.1203	$\pm 0.02$
2,4-Xylidine <sup>f</sup> .....	37.85	37.35	36.35	35.36	34.36	33.37	32.37	31.37	30.38	39.34	0.09957	$\pm 0.07$
Ethyl nitritotriacetate.....	35.18	34.67	33.64	32.61	31.58	30.55	29.52	28.49	27.46	36.73	0.1030	$\pm 0.10$

(High Melting)

Compound	Surface tension											Least squares constants		$\sigma_7$
	50°	60°	75°	85°	95°	100°	120°	140°	160°	180°	200 °C	<i>a</i>	<i>b</i>	
Diphenylamine <sup>d</sup> .....	39.26	37.73	36.72	35.70	35.19	33.16	31.12	29.09	27.05	25.02	45.36	0.1017	$\pm 0.03$	
Tribenzylamine <sup>d</sup> .....	40.45	39.35	38.25	37.70	35.50	33.30	31.11	28.91	26.71	48.69	0.1099	$\pm 0.08$		
<i>p</i> -Chloroaniline <sup>b</sup> .....	38.11	37.26	35.98	35.12	34.27	33.84	32.14	30.43	28.70	42.38	0.08536	$\pm 0.10$		
<i>N,N</i> -Dimethyl- <i>o</i> -nitroaniline <sup>e</sup> .....	37.60	36.60	35.60	35.10	33.10	31.10	29.10	45.10	0.1000	$\pm 0.10$				
<i>N,N</i> -Dimethyl- <i>m</i> -nitroaniline <sup>e</sup> .....														

<sup>a</sup> Ref. [223] (V) calc.<sup>b</sup> Ref. [215] (Maximum Bubble Pressure-A) ( $\pm 1.0$ ).<sup>c</sup> Ref. [250] ( $\pm 0.1$ ).<sup>d</sup> Ref. [228] ( $\pm 0.5$ ).<sup>e</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).<sup>f</sup> Ref. [26] (Maximum Bubble Pressure-A) ( $\pm 0.2$ ).<sup>g</sup> Ref. [139] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).<sup>h</sup> Ref. [179] (Capillary Rise-A) ( $\pm 0.3$ ).<sup>i</sup> Ref. [125] (Capillary Rise-A) ( $\pm 0.4$ ).<sup>j</sup> Ref. [25] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).

TABLE 19.3. Aminalcohols [195]

(Cap. Rise-A)

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	25°	35°	45°	55°	65°	75°	85 °C	<i>a</i>	<i>b</i>		
2-Aminoethanol <sup>a</sup> .....	49.43	48.30	47.20	46.08	44.97	43.85	42.73	41.62	51.11	0.1117	$\pm 0.02$	
3-Amino-1-propanol.....	45.5	44.7	44.0	43.2	42.5	41.7	41.0	40.2	46.6	0.0750	$\pm 0.10$	
<i>N</i> -Methyl-2,2'-iminodiethanol.....	40.5	39.8	39.1	38.4	37.7	37.0	36.3	35.6	41.6	0.0700	$\pm 0.10$	
2-Isopropylaminoethanol.....	41.6	40.7	39.8	38.9	38.0	37.1	36.2	35.3	43.0	0.0900	$\pm 0.10$	
2,2',2''-Nitrilotriethanol.....	47.2	46.4	45.6	44.8	44.0	43.2	42.4	49.2	0.0800	$\pm 0.10$		

<sup>a</sup> Ref. [178] ( $\pm 0.15$ ).

TABLE 20. Amides and urethans [228]

(Diff. Cap. Rise-A)

Compound	Surface tension ( $\pm 0.5$ )								Least squares constants		$\sigma_T$
	60°	70°	80°	90°	100°	120°	140°	150 °C	a	b	
Formanilide.....	39.05	38.17	37.30	36.42	35.55	33.80	-----	-----	44.30	0.0875	$\pm 0.03$
Acetanilide.....	-----	-----	-----	-----	-----	35.27	33.44	32.53	46.21	0.0912	$\pm 0.03$
N-Methylacetanilide.....	-----	-----	-----	-----	-----	30.66	28.73	27.77	42.20	0.0962	$\pm 0.01$
N-Ethylacetanilide.....	34.77	33.51	32.24	30.98	29.72	27.20	24.67	-----	42.34	0.1262	$\pm 0.37$
Methyl carbamate <sup>a</sup> .....	38.34	37.16	35.98	34.81	33.63	31.28	28.92	27.74	45.40	0.1177	$\pm 0.07$
Ethyl ethylcarbamate.....	31.93	30.75	29.57	28.39	27.21	24.85	22.49	21.30	39.02	0.1181	$\pm 0.34$
Ethyl propylcarbamate <sup>a</sup> .....	29.13	28.28	27.43	26.59	25.74	24.05	22.35	21.50	34.21	0.0847	$\pm 0.11$
Ethyl carbanilate.....	36.53	35.35	34.18	33.00	31.83	29.48	27.13	25.95	43.58	0.1175	$\pm 0.34$

<sup>a</sup> Ref. [83] (A) ( $\pm 0.30$ ).

TABLE 21. Aromatic alcohols

Compound	Surface tension										Least squares constants		$\sigma_T$
	70°	80°	90°	100°	120°	140°	160°	180°	200°	220 °C	a	b	
Phenethyl alcohol <sup>a</sup> .....	35.61	34.58	33.54	32.50	30.42	28.35	26.27	24.20	22.12	-----	42.88	0.1038	$\pm 0.04$
Tetrahydrofurfuryl alcohol <sup>a</sup> .....	32.90	31.90	30.89	29.88	27.86	25.85	23.83	-----	-----	-----	39.96	0.1008	$\pm 0.02$
p-Methylbenzyl alcohol <sup>b</sup> .....	33.98	33.12	32.27	31.42	29.72	28.02	26.32	-----	-----	-----	39.93	0.08507	$\pm 0.25$
1-Naphthalene-methanol <sup>b</sup> .....	-----	41.38	40.21	39.04	36.70	34.36	32.02	-----	-----	-----	50.74	0.1170	$\pm 0.50$
Benzyl alcohol <sup>c</sup> .....	28.58	27.20	25.82	24.44	21.68	18.92	16.15	13.39	-----	-----	38.25	0.1381	$\pm 0.03$
Triphenylmethanol <sup>d</sup> .....	-----	-----	-----	-----	-----	-----	-----	28.24	25.24	22.24	55.28	0.1502	-----

Compound	Surface tension										Least squares constants		$\sigma_T$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
dextro-4-Phenyl-2-butanol <sup>e</sup> .....	36.48	35.61	34.74	33.87	32.99	32.12	31.25	30.38	29.51	28.64	37.35	0.08711	-----
levo-4-Phenyl-2-butanol <sup>e</sup> .....	36.66	35.73	34.79	33.85	32.91	31.98	31.04	30.10	29.16	28.23	37.60	0.09373	$\pm 0.03$
DL-4-Phenyl-2-butanol <sup>e</sup> .....	36.64	35.67	34.70	33.73	32.76	31.79	30.82	29.85	28.88	27.91	37.61	0.09703	-----
levo-1-Phenyl-1-propanol <sup>e</sup> .....	34.89	33.95	33.02	32.08	31.15	30.22	29.28	28.35	27.41	26.48	35.82	0.0934	$\pm 0.02$
DL-1-Phenyl-1-propanol <sup>e</sup> .....	34.92	34.00	33.07	32.15	31.23	30.31	29.38	28.46	27.54	26.62	35.84	0.09222	-----

<sup>a</sup> Ref. [247] (Capillary Rise-A) ( $\pm 0.10$ ).<sup>b</sup> Ref. [106] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).<sup>c</sup> Ref. [224] (Capillary Rise-A) ( $\pm 0.10$ ).<sup>d</sup> Ref. [92] (Capillary Rise-A) ( $\pm 0.4$ ).<sup>e</sup> Ref. [207] (Capillary Rise-A).

Table 22. Aromatic esters

Compound	Surface tension											Least squares constants		$\sigma_7$	
	°C											a	b		
	10°	20°	40°	60°	80°	100°	120°	140°	160°	170°	190°				200°
Methyl salicylate <sup>a</sup>	40.98	39.80	37.45	35.11	32.76	30.40	28.06	25.71	23.37	22.19	20.77	19.18	42.15	0.1174	±0.26
Methyl <i>m</i> -hydroxybenzoate <sup>a</sup>	---	---	---	---	39.63	37.82	36.01	34.20	32.39	31.48	29.67	28.77	46.87	0.0905	±0.13
Methyl <i>p</i> -hydroxybenzoate <sup>a</sup>	---	---	---	---	---	---	---	35.77	33.75	32.73	30.70	29.69	49.57	0.1014	±0.16
Benzyl benzoate <sup>d</sup>	---	45.95	43.81	41.68	39.55	37.42	35.29	33.16	31.03	29.96	27.83	26.77	48.07	0.1065	±1.9
Ethyl salicylate <sup>c</sup>	39.91	38.82	36.64	34.45	32.27	30.09	27.91	25.73	23.54	22.45	20.27	19.18	41.00	0.1091	±0.51
Ethyl <i>m</i> -hydroxybenzoate <sup>a</sup>	---	---	---	---	---	34.42	32.52	30.63	28.73	---	---	---	43.32	0.09495	±0.03
Ethyl <i>p</i> -hydroxybenzoate <sup>a</sup>	---	---	---	---	---	---	33.68	31.84	30.01	29.09	27.25	26.33	44.69	0.09173	±0.02
Diethyl phthalate <sup>f</sup>	37.51	36.54	34.62	32.69	30.77	28.84	---	---	---	---	---	---	38.47	0.0963	±0.07
Dipentyl phthalate <sup>f</sup>	31.82	31.08	29.60	28.13	26.65	25.17	23.69	22.21	---	---	---	---	32.36	0.0739	±0.09
Ethyl $\alpha$ -campholanate <sup>d</sup>	28.46	27.64	26.02	24.39	22.76	21.13	19.51	17.88	16.25	15.44	14.81	13.00	29.27	0.08137	±0.03
Methyl <i>p</i> -toluenesulfonate <sup>c</sup>	---	---	41.26	39.42	37.59	35.76	33.93	32.09	---	---	---	---	44.92	0.09162	±0.14
Ethyl ethanesulfonate <sup>f</sup>	37.05	36.04	34.01	31.98	29.95	27.92	---	---	---	---	---	---	38.07	0.1015	±0.03
Ethyl phenylpropionate <sup>f</sup>	40.22	39.18	37.11	35.03	32.96	30.88	28.80	---	---	---	---	---	41.26	0.1038	±0.04
Ethyl 3-hydroxyatropic acid <sup>g</sup>	---	37.67	35.57	33.48	31.38	29.29	27.20	---	---	---	---	---	39.75	0.1047	±0.06
Ethyl 2- <i>O</i> -benzoyl- <i>DL</i> -lactate <sup>b</sup>	36.62	35.61	33.58	31.56	29.53	27.51	25.49	---	---	---	---	---	37.63	0.1012	±0.16
Methyl <i>DL</i> -3-phenylhydracrylate <sup>b</sup>	39.88	38.91	36.97	35.03	33.09	31.15	---	---	---	---	---	---	40.85	0.09696	±0.05

<sup>a</sup> Ref. [27] (Maximum Bubble Pressure-A) ( $\pm 0.3$ ).<sup>b</sup> Ref. [207] (Capillary Rise Method-A) ( $\pm 0.20$ ).<sup>c</sup> Ref. [125] (Capillary Rise Method-A) ( $\pm 0.3$ ).<sup>d</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).<sup>e</sup> Ref. [93] (Capillary Rise Method-A) ( $\pm 0.40$ ).<sup>f</sup> Ref. [255] (Capillary Rise Method-A) ( $\pm 0.20$ ).<sup>g</sup> Ref. [260] (Capillary Rise Method-A) ( $\pm 0.40$ ).<sup>h</sup> Ref. [95] (Capillary Rise Method-A) ( $\pm 0.30$ ).

TABLE 23. Benzene and its alkyl derivatives [44]  
(Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_T$	
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b		
Benzene <sup>a</sup>	30.21	28.88	27.56	26.25	24.96	23.67	22.40	21.20						
Toluene	29.72	28.52	27.33	26.15	24.95	23.77	22.58	21.39	20.20	19.01	30.90	0.1189	$\pm 0.01$	
Ethylbenzene <sup>c</sup>	30.39	29.29	28.20	27.10	26.01	24.92	23.82	22.73	21.63	20.54	31.48	0.1094	$\pm 0.04$	
Propylbenzene <sup>c</sup>	30.05	28.98	27.90	26.83	25.75	24.68	23.60	22.53	21.45	20.38	31.13	0.1075	$\pm 0.01$	
Camene <sup>c</sup>	29.27	28.21	27.16	26.09	25.05	24.00	22.94	21.89	20.83	19.78	30.32	0.1054	$\pm 0.01$	
Butylbenzene	30.25	29.23	28.20	27.18	26.15	25.13	24.10	23.08	22.05	21.03	31.28	0.1025	$\pm 0.01$	
Isobutylbenzene	28.43	27.47	26.51	25.55	24.58	23.62	22.66	21.70	20.74	19.78	29.39	0.0961	$\pm 0.01$	
sec-Butylbenzene	29.50	28.52	27.54	26.57	25.59	24.61	23.63	22.65	21.67	20.69	30.48	0.0979	$\pm 0.01$	
tert-Butylbenzene	29.11	28.13	27.14	26.16	25.17	24.19	23.20	22.22	21.23	20.25	30.10	0.0985	$\pm 0.01$	
Pentylbenzene <sup>a</sup>	30.38	29.45	28.52	27.59	26.65	25.72	24.79	23.86	22.93	22.00	31.31	0.0931	$\pm 0.04$	
1-Phenylhexane <sup>a</sup>	30.96	30.01	29.15	28.10	27.15	26.20	25.25	24.29	23.34	22.39	31.91	0.0952	$\pm 0.04$	
o-Xylene <sup>c</sup>	31.41	30.31	29.21	28.11	27.00	25.90	24.80	23.70	22.60	21.50	32.51	0.1101	$\pm 0.03$	
m-Xylene <sup>c</sup>	30.13	29.02	27.92	26.81	25.71	24.61	23.50	22.40	21.29	20.19	31.23	0.1104	$\pm 0.02$	
p-Xylene <sup>c</sup>		28.55	27.47	26.39	25.32	24.25	23.17	22.10	21.02	19.95	30.69	0.1074	$\pm 0.05$	
o-Ethyltoluene	31.27	30.21	29.15	28.09	27.03	25.97	24.91	23.85	22.79	21.73	32.33	0.1060	$\pm 0.01$	
m-Ethyltoluene	30.18	29.08	27.97	26.87	25.76	24.66	23.55	22.45	21.34	20.24	31.29	0.1105	$\pm 0.01$	
p-Ethyltoluene	29.90	28.83	27.75	26.68	25.60	24.53	23.45	22.38	21.30	20.23	30.98	0.1075	$\pm 0.01$	
o-Diethylbenzene	31.32	30.29	29.26	28.24	27.20	26.18	25.15	24.12	23.09	22.06	32.35	0.1029	$\pm 0.01$	
m-Diethylbenzene	30.21	29.17	28.12	27.08	26.04	24.99	23.94	22.90	21.85	20.81	31.26	0.1045	$\pm 0.01$	
p-Diethylbenzene	30.03	29.00	27.97	26.94	25.91	24.88	23.85	22.82	21.79	20.76	31.06	0.1030	$\pm 0.01$	
1,2,4-Trimethylbenzene <sup>c</sup>	30.73	29.71	28.68	27.66	26.63	25.61	24.58	23.56	22.53	21.51	31.76	0.1025	$\pm 0.02$	
1,2,3-Trimethylbenzene <sup>c</sup>	29.87	28.83	27.79	26.75	25.71	24.67	23.63	22.59	21.55	20.51	30.91	0.1040	$\pm 0.01$	
1-Phenyldecane <sup>d</sup>	31.85	30.97	30.08	29.21	28.32	27.44	26.55	25.67	24.79	23.91	32.73	0.08822	$\pm 0.01$	
Mesitylene <sup>c</sup>	28.89	28.00	27.10	26.20	25.31	24.41	23.51	22.62	21.72	20.82	29.79	0.08966	$\pm 0.16$	
Cymene <sup>b</sup>	27.95	27.08	26.20	25.32	24.44	23.57	22.69	21.81	20.94	20.06	28.83	0.0877	$\pm 0.14$	

<sup>a</sup> Ref. [1].<sup>b</sup> Ref. [179] (Capillary Rise Method-A) ( $\pm 0.2$ ).<sup>c</sup> Ref. [181] (Capillary Rise Method-A) ( $\pm 0.10$ ).<sup>d</sup> Ref. [112] (Capillary Rise Method-N<sub>2</sub>) ( $\pm 0.10$ ).<sup>e</sup> Ref. [108] (N<sub>2</sub>) ( $\pm 2.0$ ).TABLE 24.1. N-methylacetanilide—boron trifluoride [260]  
(Capillary Rise Method-A)

Surface tension ( $\pm 0.06$ )								Least squares constants	
115°	120°	125°	130°	135°	140°	145°	150 °C	a	b
38.39	37.90	37.41	36.92	36.43	35.94	35.45	34.95	49.67	0.0981

TABLE 24.2. Boron tribromide [229]  
(Maximum Bubble Pressure-A)

Surface tension									Least squares constants	
22°	25°	30°	40°	50°	60°	70°	80°	84 °C	<i>a</i>	<i>b</i>
29.1	28.7	28.1	26.8	25.5	24.2	22.9	21.7	21.2	31.90	0.1280

TABLE 24.3. Tributylboroxin [146]  
(Maximum Bubble Pressure-II<sub>2</sub>)

Surface tension ( $\pm 0.15$ )						Least squares constants		$\sigma_r$
5°	10°	15°	20°	25°	30 °C	<i>a</i>	<i>b</i>	
27.37	26.88	26.39	25.89	25.40	24.91	27.86	0.0983	$\pm 0.13$

TABLE 24.4. Boron trifluoride addition compounds [260]  
(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 0.2$ )									Least squares constants	
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>
Methyl formate—boron trifluoride.....			39.47	38.53	37.59	36.65				42.28	0.09383
Ethyl formate—boron trifluoride.....	35.91	35.33	34.16	32.99	31.84	30.66				37.66	0.11672
Methyl acetate—boron trifluoride.....						32.42	31.12	29.82	28.52	40.22	0.1300
Ethyl acetate—boron trifluoride.....				31.59	30.72	29.86	29.00			35.04	0.08633
Dimethyl ether—boron trifluoride.....		33.18	32.01	30.84	29.66	28.49				35.53	0.1173
Diethyl ether—boron trifluoride.....	30.29	29.84	28.95	28.06	27.17	26.27				31.63	0.08927

TABLE 24.5. Boroxin [47]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.10$ )										Least squares constants	
240°	250°	260°	265°	270°	275°	280°	285°	290°	295 K	<i>a</i>	<i>b</i>
27.5	26.2	25.0	24.3	23.7	23.0	22.4	21.7	21.1	20.5	58.31	0.1283

TABLE 24.6. Dimethylaminoboron dichloride [24]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.10$ )														Least squares constants		$\sigma_{\gamma}$	
40°	-35°	-30°	-25°	-20°	-15°	-10°	-5°	5°	10°	15°	20°	25°	30°	35 °C	a		b
33.39	33.23	32.95	32.70	32.13	30.85	30.56	29.77	28.82	28.25	27.40	27.09	26.07	25.06	24.90	29.24	0.1238	$\pm 0.02$

TABLE 25. Bromine [31]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.6$ )										Least squares constants	
5°	10°	15°	20°	25°	30°	35°	40°	45°	50 °C	a	b
44.7	43.6	42.9	41.8	40.9	40.0	39.2	38.3	37.3	36.4	45.5	0.1820

TABLE 26.1. Halides of phosphorus [249]  
(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_{\gamma}$
	15°	25°	35°	45°	55°	65°	75°	85 °C	a	b	
Phosphorus trichloride.....	29.24	27.97	26.71	25.44	24.18	22.91	-----	-----	31.14	0.1266	$\pm 0.06$
Phosphoryl chloride.....	33.31	32.03	30.76	29.48	28.21	26.93	25.66	24.38	35.22	0.1275	$\pm 0.07$
Phosphorus tribromide.....	43.42	42.13	40.85	39.57	38.28	37.00	-----	-----	45.34	0.1283	$\pm 0.10$
Phosphorus triiodide <sup>a</sup> .....	-----	-----	-----	-----	-----	57.26	56.58	55.90	61.66	0.06771	$\pm 0.11$
Thiophosphoryl chloride <sup>b</sup> .....	35.09	33.82	32.55	31.28	30.00	28.73	27.46	26.19	37.00	0.1272	-----

<sup>a</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).

<sup>b</sup> Ref. [192] (Capillary Rise Method-A) ( $\pm 0.7$ ).

TABLE 26.2. Stannic chloride [169]  
(Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.15$ )										Least squares constants		$\sigma_{\gamma}$
10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
28.79	27.65	26.52	25.38	24.25	23.12	21.98	20.85	19.71	18.58	29.92	0.1134	$\pm 0.05$

TABLE 26.3. Antimony trichloride [219]  
(Maximum Bubble Pressure-A)

Surface tension ( $\pm 1.0$ )								Least squares constants		$\sigma_7$
80°	90°	100°	120°	140°	160°	180°	200 °C	a	b	
47.97	46.73	45.49	43.01	40.54	38.06	35.59	33.11	47.87	0.1238	$\pm 0.17$

TABLE 26.4. Silicon tetrachloride [177]  
(Capillary Rise Method-A)

Surface tension ( $\pm 1.0$ )								Least squares constants	
5°	10°	15°	20°	25°	30°	40°	50 °C	a	b
20.28	19.78	19.29	18.79	18.29	17.79	16.80	15.80	20.78	0.099624

TABLE 26.5. Arsenious chloride [108]  
(Maximum Bubble Pressure-N<sub>2</sub>)

Surface tension ( $\pm 2.0$ )										Least squares constants		$\sigma_7$
-10°	10°	20°	30°	40°	50°	60°	80°	100°	110 °C	a	b	
42.65	40.69	39.71	38.74	37.76	36.78	35.80	33.85	31.89	30.91	41.67	0.09781	$\pm 0.12$

TABLE 26.6. Arsenious bromide [10E]  
(Maximum Bubble Pressure-N<sub>2</sub>)

Surface tension ( $\pm 2.0$ )										Least squares constants		$\sigma_7$
40°	50°	60°	70°	80°	100°	120°	140°	160°	180 °C	a	b	
50.24	49.19	48.15	47.11	46.07	43.98	41.89	39.81	37.72	35.64	54.41	0.1043	$\pm 0.56$



TABLE 26.7. Phosphorus trioxide [190]  
(Capillary Rise Method)

Surface tension									Least squares constants		$\sigma_{\gamma}$
30°	40°	50°	60°	70°	80°	100°	120°	140 °C	<i>a</i>	<i>b</i>	
36.97	35.81	34.65	33.49	32.33	31.18	28.86	26.54	24.23	40.44	0.1158	$\pm 0.15$

TABLE 27. Campholenic and campholanic acid [108]  
(Maximum Bubble Pressure-N<sub>2</sub>)

Compound	Surface tension ( $\pm 2.0$ )										Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	80°	100°	120°	140°	160°	180°	200 °C	<i>a</i>	<i>b</i>	
$\alpha$ -Campholenic acid.....	35.12	33.40	31.67	29.95	28.23	26.51	24.79	23.06	21.34	19.62	36.84	0.0861	$\pm 0.26$
$\alpha$ -Campholanic acid.....	32.21	30.63	29.06	27.48	25.91	24.34	22.76	21.19	19.61	18.04	33.78	0.0787	$\pm 0.71$

TABLE 2B. Chelated co-ordination compounds and related compounds [221]  
(Max. Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.20$ )											Least squares constants		$\sigma_y$
	Surface tension ( $\pm 0.20$ )											a	b	
	10°	15°	20°	30°	40°	50°	60°	70°	80°	100 °C.				
Tetraethyllead.....	29.53	29.05	28.56	27.59	26.62	25.55	24.69	23.72	22.75			30.50	0.0969	$\pm 0.17$
2, 4-Hexanedioneberyllium.....						32.33	31.78	30.73	29.68	27.58		38.08	0.1050	$\pm 0.04$
2, 4-Pentanedione.....	32.14	31.56	30.99	29.85	28.70	27.56	26.42	25.27	24.13			33.28	0.1144	$\pm 0.17$
2, 4-Hexanedione.....		30.72	30.22	29.21	28.21	27.21	26.21					32.22	0.1002	$\pm 0.01$
1-Phenyl-1, 3-butanedione.....						39.35	38.83	38.31	37.79	36.74		41.96	0.05215	$\pm 0.60$
2, 4-Pentanedioneboron difluoride.....						37.08	36.09	35.10	34.11	32.13		42.04	0.0991	$\pm 0.09$
Thallos ethoxide.....		38.69	38.26	37.39	36.52	35.64	34.77					40.00	0.0871	$\pm 0.15$

Compound	Surface tension ( $\pm 0.20$ )											Least squares constants		$\sigma_y$
	Surface tension ( $\pm 0.20$ )											a	b	
	110°	120°	130°	140°	160°	180°	200°	220°	240°	260°	280 °C.			
Dimethyl-(1-phenyl-1, 3-butanedione)thallium.....		33.35	32.38	31.40	29.55							45.07	0.09756	$\pm 0.06$
Thallos formate.....	81.19	77.30	73.42	69.54								123.90	0.3883	$\pm 0.50$
Thallos acetate.....		29.83	28.49	25.82	23.14	20.47						47.21	0.01337	$\pm 0.05$
Thallos nitrate.....						113.41	111.64	109.86	108.08			131.18	0.08884	$\pm 0.20$
Diphenylmercury.....		36.63	35.80	34.97	33.30	31.64						46.60	0.0831	$\pm 0.14$
2, 4-Pentanedioneberyllium.....	28.41	27.47	26.52	25.57	23.68	21.79						38.83	0.09469	$\pm 0.06$
Basic beryllium propionate.....				20.55	18.81	17.08						32.70	0.0868	$\pm 0.07$
2, 4-Pentanedioneostannic difluoride.....							29.18	27.21	25.23			48.95	0.09884	$\pm 0.04$
2, 4-Pentanedionealuminum.....							19.13	17.63	16.12	14.62	13.12	34.16	0.07515	$\pm 0.10$
Aluminum bromide.....	24.93	24.23	23.52	22.82	21.41							32.69	0.0705	$\pm 0.10$

TABLE 29. Cryogenic and low boiling fluids

	Surface tension							Least squares constants		$\sigma_\gamma$
	78°	80°	82°	84°	86°	88°	90 K	a	b	
Nitrogen.....	8.75	8.30	7.85	7.39	6.94	6.49	6.03	26.42	0.2265	$\pm 0.05$

Ref. [210] (Capillary Rise Method-V).

	Surface tension ( $\gamma = 37.78(1 - T/150.72)^{1.217}$ )					Least squares constants		$\sigma_\gamma$
	84°	86°	88°	90°	92 K	a	b	
Argon.....	13.34	12.84	12.34	11.84	11.34	24.28	0.2493	$\pm 0.02$

Ref. [210] (Capillary Rise Method-V).

	Surface tension					Least squares constants		$\sigma_\gamma$
	115°	118°	120°	122°	124 K	a	b	
Krypton.....	8.341	6.474	5.896	5.318	4.740	40.576	0.2890	$\pm 0.048$

Ref. [67] (Capillary Rise Method-V).

	Surface tension ( $\gamma = 0.03703(289.74 - T)^{1.267}$ )										$\sigma_\gamma$
	165°	175°	185°	195°	205°	215°	225°	245°	265°	285 K	
Xenon.....	18.46	16.58	14.74	12.96	11.23	9.55	7.94	4.94	2.30	0.28	$\pm 0.10$

Ref. [206] (Capillary Rise Method-V).

	Surface tension ( $\gamma = 0.352 - 6.9 \times 10^{-2} T^{7/2}$ )									$\sigma_\gamma$
	0.50°	0.75°	1.00°	1.25°	1.50°	1.75°	2.00°	2.1 K		
Helium II.....	0.351	0.347	0.345	0.340	0.334	0.327	0.317	0.313		

Ref. [6] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension <sup>a</sup>									
	0.361°	0.500°	0.574°	0.647°	0.820°	0.910°	1.132°	1.639°	2.328°	2.992 K
Helium III.....	0.151	0.150	0.151	0.152	0.149	0.147	0.131	0.111	0.069	0.028

<sup>a</sup> Measured from a greatly enlarged copy of the  $\gamma$  vs  $T^\circ$  curve.  
Ref. [237] (Capillary Rise Method-V).

	Surface tension ( $\gamma = 0.3729 - 0.0081T^{2.5}$ )								
	0.35°	0.50°	0.65°	0.80°	0.95°	1.10°	1.25°	1.40 K	
Helium IV.....	0.373	0.372	0.370	0.368	0.366	0.360	0.359	0.354	

Ref. [7] (Capillary Rise Method-V).

	Surface tension ( $\gamma = 0.1124(33.19 - t)^{1.112} (\pm 0.003)$ )					
	-258°	-257°	-256°	-255°	-254°	-253 °C
Hydrogen.....	2.80	2.63	2.41	2.29	2.12	1.95

Ref. [210] (Calculated from Guggenheim-Ferguson equation).

	Surface tension						Least squares constants	
	15°	16°	17°	18°	19°	20 K	a	b
Deuterium hydride.....	3.713	3.524	3.336	3.148	2.959	2.771	6.537	0.1883

Ref. [77] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.2$ )										Least squares constants		$\sigma_\gamma$
	-202°	-200°	-198°	-196°	-194°	-192°	-190°	-188°	-186°	-184 °C	a	b	
Oxygen.....	18.01	17.50	16.99	16.48	15.96	15.45	14.94	14.43	13.91	13.40	-33.72	0.2561	$\pm 0.02$

Ref. [9] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension ( $\pm 0.2$ )								Least squares constants		$\sigma_\gamma$
	-202°	-200°	-198°	-196°	-194°	-192°	-190°	-188 °C	a	b	
Fluorine.....	17.15	16.82	16.49	16.16	15.83	15.50	15.17	14.84	-16.10	0.1646	$\pm 0.50$

Ref. [259] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.2$ )						Least squares constants		$\sigma_\gamma$
	-80°	-70°	-60°	-50°	-40°	-30 °C	a	b	
Chlorine.....	35.05	33.15	31.25	29.36	27.46	25.56	19.87	0.1897	$\pm 0.06$

Ref. [118] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.20$ )										Least squares constants		$\sigma_\gamma$
	-80°	-70°	-60°	-50°	-40°	-30°	-20°	-10°	10°	20 °C	a	b	
Hydrogen fluoride.....	16.70	15.92	15.13	14.34	13.56	12.77	11.98	11.20	9.62	8.84	10.41	0.07867	

Ref. [203] (Maximum Bubble Pressure-N<sub>2</sub>).

	Surface tension						Least squares constants		$\sigma_\gamma$
	-192°	-190°	-188°	-186°	-184°	-182 °C	a	b	
Carbon monoxide.....	9.60	9.19	8.77	8.36	7.94	7.53	-30.20	0.2073	$\pm 0.04$

Ref. [210] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.5$ ) ( $\gamma = 0.05902(304.26 - t)^{1.25}$ )									$\sigma_\gamma$
	-30°	-20°	-10°	0°	10°	15°	20°	25°	30 °C	
Carbon dioxide.....	10.08	8.06	6.14	4.34	2.67	1.90	1.19	0.57	0.07	

Ref. [230, 231] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension ( $\pm 0.2$ )						Least squares constants	
	$-120^{\circ}$	$-110^{\circ}$	$-100^{\circ}$	$-90^{\circ}$	$-80^{\circ}$	$-70^{\circ}$ °C	<i>a</i>	<i>b</i>
Nitryl fluoride.....	30.51	28.65	26.80	24.95	23.09	21.24	8.26	0.1854

Ref. [92] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.2$ )						Least squares constants	
	$-100^{\circ}$	$-90^{\circ}$	$-80^{\circ}$	$-75^{\circ}$	$-70^{\circ}$	$-60^{\circ}$ °C	<i>a</i>	<i>b</i>
Nitrogen oxyfluoride.....	25.65	24.49	23.32	22.74	22.16	20.99	14.00	0.1165

Ref. [94] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.5$ )								Least squares constants	
	$-75^{\circ}$	$-70^{\circ}$	$-65^{\circ}$	$-60^{\circ}$	$-55^{\circ}$	$-50^{\circ}$	$-45^{\circ}$	$-40^{\circ}$ °C	<i>a</i>	<i>b</i>
Perchloryl fluoride.....	24.1	23.3	22.5	21.7	20.9	20.1	19.3	18.5	12.24	0.1576

Ref. [202] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.2$ )						Least squares constants		$\sigma_{\gamma}$
	$-90^{\circ}$	$-80^{\circ}$	$-70^{\circ}$	$-60^{\circ}$	$-50^{\circ}$	$-40^{\circ}$ °C	<i>a</i>	<i>b</i>	
Sulfur tetrafluoride.....	28.47	26.74	25.01	23.27	21.54	19.81	12.87	0.1734	$\pm 0.16$

Ref. [25] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.3$ )				Least squares constants		$\sigma_{\gamma}$
	$-65^{\circ}$	$-50^{\circ}$	$-40^{\circ}$	$-20^{\circ}$ °C	<i>a</i>	<i>b</i>	
Sulfur hexafluoride.....	13.40	11.61	10.42	8.04	5.66	0.1190	$\pm 0.01$

Ref. [167] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension ( $\pm 0.2$ )						Least squares constants	
	$-80^{\circ}$	$-75^{\circ}$	$-70^{\circ}$	$-65^{\circ}$	$-60^{\circ}$	$-50^{\circ}\text{C}$	<i>a</i>	<i>b</i>
Nitrosyl peroxide fluoride.....	23.36	22.78	22.19	21.61	21.03	19.86	14.03	0.1166

Ref. [94] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.02$ )							Least squares constants	
	$-60^{\circ}$	$-50^{\circ}$	$-40^{\circ}$	$-30^{\circ}$	$-20^{\circ}$	$-10^{\circ}$	$10^{\circ}\text{C}$	<i>a</i>	<i>b</i>
Hydrogen disulfide.....	59.50	57.74	55.98	54.22	52.47	50.71	47.19	48.95	0.1758

Ref. [29] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.3$ )							Least squares constants	
	$-30^{\circ}$	$-25^{\circ}$	$-20^{\circ}$	$-15^{\circ}$	$-10^{\circ}$	$-5^{\circ}$	$5^{\circ}\text{C}$	<i>a</i>	<i>b</i>
Hydrogen selenide.....	26.77	26.03	25.28	24.54	23.80	23.06	21.58	22.32	0.1482

Ref. [183] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.14$ )						Least squares constants	
	$-30^{\circ}$	$-25^{\circ}$	$-20^{\circ}$	$-15^{\circ}$	$-10^{\circ}$	$-5^{\circ}\text{C}$	<i>a</i>	<i>b</i>
Hydrogen telluride.....	36.89	35.58	34.27	32.96	31.65	30.34	29.03	0.2619

Ref. [183] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.2$ )						Least squares constants		$\sigma_7$
	$-75^{\circ}$	$-70^{\circ}$	$-65^{\circ}$	$-60^{\circ}$	$-55^{\circ}$	$-50^{\circ}\text{C}$	<i>a</i>	<i>b</i>	
Hydrogen bromide.....	28.69	27.65	26.61	25.57	24.53	23.50	13.10	0.2079	$\pm 0.02$

Ref. [168] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension ( $\pm 1.0$ )						Least squares constants		$\sigma_7$
	-45°	-40°	-35°	-30°	-20°	-10 °C	a	b	
Nitrosyl chloride.....	36.21	35.46	34.72	33.97	32.48	30.98	29.49	0.1493	$\pm 0.07$

Ref. [22] (Capillary Rise Method-A).

	Surface tension ( $\gamma = 38.618 - 0.1873T - 0.0003567T^2$ )						$\sigma_7$
	90°	95°	100°	105°	110°	115 K	
Methane.....	18.877	17.611	16.328	15.026	13.707	12.371	0.025

Ref. [67] (Capillary Rise Method-V).

	Surface tension						Least squares constants		$\sigma_7$
	-140°	-130°	-120°	-110°	-100°	-90 °C	a	b	
Ethane.....	24.48	22.82	21.16	19.50	17.84	16.18	1.24	0.1660	$\pm 0.07$

Ref. [130] (Capillary Rise Method-V) ( $\pm 0.12$ ).

	Surface tension						Least squares constants		$\sigma_7$
	-90°	-70°	-50°	-30°	-10°	10 °C	a	b	
Propane.....	17.09	15.34	13.59	11.84	10.09	8.35	9.22	0.0874	$\pm 0.14$

Ref. [122] (Capillary Rise Method-V).

	Surface tension									Least squares constants		$\sigma_7$
	-70°	-60°	-50°	-40°	-30°	-20°	-10°	10°	20 °C	a	b	
Butane.....	23.31	22.50	20.90	19.69	18.49	17.28	16.08	13.66	12.46	14.87	0.1206	$\pm 0.04$
2-Methylpropane.....	21.46	20.25	19.15	17.88	16.54	15.30	14.09	11.57	10.30	12.83	0.1236	$\pm 0.09$
1-Butene.....	24.45	23.12	21.81	20.48	19.16	17.84	16.51	13.87	12.54	15.19	0.1323	$\pm 0.03$
2-Butene.....	25.13	23.84	22.56	21.24	19.98	18.69	17.40	14.82	13.53	16.11	0.1289	$\pm 0.03$
2-Methylpropene.....			21.68	19.98	18.70	17.41	16.13	13.56	12.27	14.84	0.1319	$\pm 0.13$

Ref. [37] (Capillary Rise Method-V).



TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension						Least squares constants		$\sigma_s$
	-90°	-80°	-70°	-60°	-50°	-40 °C	<i>a</i>	<i>b</i>	
Propyne.....	27.85	26.37	24.88	23.40	21.92	20.44	14.51	0.1482	$\pm 0.16$

Ref. [142] (Capillary Rise Method-V).

	Surface tension					Least squares constants		$\sigma_s$
	-90°	-80°	-70°	-60°	-50 °C	<i>a</i>	<i>b</i>	
Acetylene.....	20.84	18.90	16.97	15.03	13.10	3.42	0.1935	$\pm 0.05$

Ref. [142] (Capillary Rise Method-V).

	Surface tension						Least squares constants		$\sigma_s$
	-160°	-150°	-140°	-130°	-120°	-110 °C	<i>a</i>	<i>b</i>	
Ethylene.....	27.93	25.08	23.23	21.37	19.52	17.66	-2.73	0.1854	$\pm 0.05$

Ref. [142] (Capillary Rise Method-V) ( $\pm 0.14$ ).

	Surface tension						Least squares constants		$\sigma_s$
	-80°	-70°	-60°	-50°	-40°	-30 °C	<i>a</i>	<i>b</i>	
Propylene.....	21.41	19.98	18.55	17.13	15.70	14.27	9.99	0.1427	$\pm 0.07$

Ref. [142] (Capillary Rise Method-V).

	Surface tension						Least squares constants		$\sigma_s$
	-50°	-40°	-30°	-20°	10°	20 °C	<i>a</i>	<i>b</i>	
Ethylene oxide.....	35.98	34.32	32.65	29.99	26.00	24.33	27.66	0.1664	$\pm 0.10$

Ref. [221] (Maximum Bubble Pressure-A).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension ( $\gamma = 23.41 - 0.3371t - 0.000943t^2$ )								$\sigma_\gamma$
	-75°	-70°	-65°	-60°	-55°	-50°	-45°	-40 °C	
Ammonia.....	43.39	42.39	41.34	40.25	39.10	37.91	36.67	35.38	$\pm 0.15$

Ref. [210] (Maximum Bubble Pressure-H<sub>2</sub>).

	Surface tension ( $\pm 0.1$ )								Least squares constants		$\sigma_\gamma$
	-70°	-60°	-50°	-45°	-40°	-35°	-30°	-25 °C	a	b	
Dimethyl ether.....	25.32	23.84	22.36	21.62	20.88	20.14	19.40	18.67	14.97	0.1478	$\pm 0.06$

Ref. [142] (Capillary Rise Method-V).

	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_\gamma$
	-95°	-85°	-75°	-65°	-55°	-45°	-30°	-20°	-10°	5 °C	a	b	
Carbonyl sulfide.....	29.02	27.24	25.46	23.68	21.90	20.13	17.46	15.68	13.90	11.22	12.12	0.1779	$\pm 0.33$

Ref. [164] (Capillary Rise Method-V).

	Surface tension						Least squares constants		$\sigma_\gamma$
	-50°	-40°	-30°	-20°	-10°	10 °C	a	b	
Sulfur dioxide.....	36.32	34.37	32.42	30.48	28.53	24.63	26.58	0.1948	$\pm 0.15$

Ref. [212] (Capillary Rise Method-V).

	Surface tension						Least squares constants		$\sigma_\gamma$
	-100°	-80°	-60°	-40°	-20°	-10 °C	a	b	
Nitrous oxide.....	25.41	21.35	17.28	13.22	9.15	7.12	5.09	0.2032	$\pm 0.60$

Ref. [175] (Capillary Rise Method-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension					Least squares constants		$\sigma_\gamma$
	-160°	-158°	-156°	-154°	-152 °C	<i>a</i>	<i>b</i>	
Nitric oxide.....	26.17	25.00	23.83	22.66	21.49	-67.48	0.5853	±0.22

Ref. [32] (Capillary Rise Method-V).

	Surface tension (±0.06)							Least squares constants	
	-116°	-112°	-108°	-104°	-100°	-96°	-92 °C	<i>a</i>	<i>b</i>
Boron trifluoride.....	20.71	19.82	19.00	18.19	17.38	16.57	15.76	-2.92	0.2030

Ref. [259] (Capillary Rise Method-V).

	Surface tension (±0.06)						Least squares constants	
	-30°	-25°	-20°	-15°	-10°	-5 °C	<i>a</i>	<i>b</i>
Boron trifluoride ether.....	36.14	35.55	34.96	34.36	33.77	33.17	32.58	0.1188

Ref. [259] (Capillary Rise Method-V).

	Surface tension (±0.10)						Least squares constants		$\sigma_\gamma$
	-150°	-140°	-130°	-120°	-110°	-100 °C	<i>a</i>	<i>b</i>	
Diborane.....	23.62	21.83	20.05	18.27	16.48	14.70	-3.13	0.1783	±0.03

Ref. [128] (Maximum Bubble Pressure).

	Surface tension (±0.3)								Least squares constants		$\sigma_\gamma$
	-100°	-80°	-60°	-40°	-20°	-10°	-5°	5 °C	<i>a</i>	<i>b</i>	
Carbonyl chloride.....	37.15	34.24	31.33	28.41	25.50	24.05	23.32	21.86	22.59	0.1456	±0.04

Ref. [165] (Drop Weight-V).

TABLE 29. Cryogenic and low boiling fluids—Continued

	Surface tension											Least squares constants		$\sigma_7$		
	-70°	-60°	-50°	-40°	-30°	-20°	-10°	10°	20°	25°	30 °C	a	b			
2-Methyl-2-butene																
(a)-----	28.60	27.33	26.06	24.78	23.51	22.24	20.97					19.70	0.1271	$\pm 0.15$		
(b)-----								18.61	17.64	17.15	16.67	19.58	0.09715			

(a) Ref. [198] (Capillary Rise Method-V).

(b) Ref. [1].

TABLE 30.1. Nitriles

(Cap. Rise-A)

Compound	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b		
Acetonitrile <sup>a</sup> -----		29.29	28.03	26.77	25.50	24.24					31.82	0.1263	$\pm 0.03$
Propionitrile <sup>a</sup> -----		27.32	26.17	25.02	23.86	22.71					29.63	0.1153	$\pm 0.09$
Butyronitrile <sup>a</sup> -----		27.44	26.40	25.36	24.32	23.29	22.25	21.21	20.18		29.51	0.1037	$\pm 0.08$
Valeronitrile <sup>a</sup> -----		27.41	26.47	25.53	24.60	23.66	22.72	21.78	20.85	29.28	0.0937	$\pm 0.09$	
Isovaleronitrile <sup>c</sup> -----	26.34	25.93	25.10	24.27	23.44	22.62	21.79	20.96	20.14	27.58	0.0827	$\pm 0.16$	
Hexanenitrile <sup>a</sup> -----		27.83	26.92	26.01	25.10	24.20	23.29	22.38	21.48	29.64	0.0907	$\pm 0.04$	
4-Methylvaleronitrile <sup>a</sup> -----		27.06	26.14	25.22	24.30	23.39	22.47	21.55	20.64	28.89	0.0917	$\pm 0.14$	
Heptanenitrile <sup>b</sup> -----	28.18	27.75	26.89	26.03	25.17	24.31	23.45	22.59	21.73	29.47	0.0860	$\pm 0.16$	
Octanenitrile <sup>b</sup> -----	28.41	28.01	27.20	26.40	25.60	24.80	24.00	23.19	22.39	29.61	0.0802	$\pm 0.06$	
Nonanenitrile <sup>b</sup> -----	29.91	28.50	27.68	26.87	26.05	25.32	24.42	23.60	22.79	30.13	0.0816	$\pm 0.06$	
3-Butenenitrile <sup>a</sup> -----	29.77	29.23	28.14	27.06	25.97	24.89	23.80	22.72	21.63	31.40	0.1085	$\pm 0.04$	
Decanenitrile <sup>c</sup> -----	29.89	29.36	28.30	27.24	26.17	25.11	24.05	22.99	21.93	31.48	0.1061	$\pm 0.01$	
Succinonitrile <sup>d</sup> -----						46.79	45.71	44.63	43.55	53.26	0.1079	$\pm 0.01$	
Lactonitrile <sup>c</sup> -----	36.87	36.39	35.43	34.47	33.51	32.55	31.59	30.63	29.67	38.31	0.0960	$\pm 0.01$	
Phenylacetoneitrile <sup>a</sup> -----	42.84	42.26	41.10	39.95	38.79	37.64	36.48	35.33	34.17	44.57	0.1155	$\pm 0.12$	
Benzonitrile <sup>a</sup> -----	39.95	39.37	38.21	37.05	35.89	34.74	33.58	32.42	31.26	41.69	0.1159	$\pm 0.07$	
DL-Mandelonitrile <sup>e</sup> -----	44.43	43.94	42.97	41.99	41.01	40.03	39.05	38.08	37.90	45.90	0.0978	$\pm 0.02$	
o-Tolunitrile <sup>c</sup> -----	38.44	37.86	36.70	35.53	34.37	33.21	32.04	30.88	29.71	40.19	0.1164	$\pm 0.03$	
m-Tolunitrile <sup>c</sup> -----	37.33	36.82	35.81	34.80	33.78	32.77	31.76	30.75	29.73	38.85	0.1013	$\pm 0.03$	
p-Tolunitrile <sup>c</sup> -----			36.49	35.39	34.29	33.19	32.09	30.99	29.89	39.79	0.1100	$\pm 0.02$	

TABLE 30.1. Nitriles—Continued

Compound	Surface tension										Least squares constants		$\sigma_\gamma$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
3-(Ethylamino)-propionitrile <sup>b</sup>	33.30	32.83	32.35	31.88	30.93	29.97	29.03	28.07	27.13	26.18	34.73	0.0951	±0.08
3-(Propylamino)-propionitrile <sup>b</sup>	31.81	31.37	30.93	30.48	29.61	28.72	27.84	26.96	26.07	-----	33.13	0.0882	±0.08
3-(Butylamino)-propionitrile <sup>b</sup>	31.21	30.80	30.38	29.97	29.15	28.33	27.51	26.69	25.86	25.04	32.44	0.0822	±0.06
3-(1-Pentylamino)-propionitrile <sup>b</sup>	30.98	29.51	29.13	28.75	27.99	27.28	26.48	25.72	24.96	24.21	31.02	0.0757	±0.09
3-(Hexylamino)-propionitrile <sup>b</sup>	30.20	29.93	29.46	29.09	28.35	27.61	26.88	26.14	25.40	24.66	31.31	0.0739	±0.05
3-(Diethylamino)-propionitrile <sup>b</sup>	31.65	30.18	29.70	29.22	28.27	27.32	26.37	25.42	24.47	-----	32.08	0.0952	±0.05
3-(Dipropylamino)-propionitrile <sup>b</sup>	29.41	28.99	28.57	28.15	27.31	26.46	25.62	24.78	23.94	23.10	30.67	0.0841	±0.04
3-(Dibutylamino)-propionitrile <sup>b</sup>	29.60	29.19	28.77	28.35	27.51	26.67	25.84	25.00	24.16	23.33	30.86	0.0837	±0.03
3-(Di-1-pentylamino)-propionitrile <sup>b</sup>	29.10	28.73	28.35	27.98	27.23	26.48	25.74	24.99	24.24	23.50	30.22	0.0747	±0.01
3-Methoxypropionitrile <sup>b</sup>	36.47	35.88	35.28	34.69	33.51	32.33	31.15	29.97	28.78	27.60	38.24	0.1182	±0.14
3-Ethoxypropionitrile <sup>b</sup>	32.01	31.52	31.02	30.53	29.54	28.55	27.56	26.57	25.58	24.59	33.50	0.0990	±0.06
3-Propoxypropionitrile <sup>b</sup>	30.11	29.75	29.39	29.02	28.30	27.57	26.85	26.12	25.40	24.67	31.20	0.0725	±0.45
3-Butoxypropionitrile <sup>b</sup>	30.33	29.90	29.47	29.04	28.19	27.33	26.47	25.62	24.76	23.91	31.61	0.0856	±0.08
3-Pentyloxypropionitrile <sup>b</sup>	30.78	30.36	29.93	29.51	28.66	27.81	26.96	26.11	25.26	24.41	32.06	0.0850	±0.05
3-Hexyloxypropionitrile <sup>b</sup>	30.74	30.33	29.92	29.52	28.70	27.89	27.08	26.26	25.45	24.63	31.96	0.0814	±0.01
Acrylonitrile <sup>b</sup>	27.81	27.22	26.63	26.05	24.87	23.69	22.51	-----	-----	-----	29.58	0.1178	±0.04
3-Heptyloxypropionitrile <sup>f</sup>	-----	29.38	29.01	28.63	27.89	27.14	26.40	25.65	24.91	-----	30.87	0.0745	±0.05

<sup>a</sup> Ref. [115] (A) (±0.1).<sup>b</sup> Ref. [253] (A) (±0.1).<sup>c</sup> Ref. [91] (A) (±0.2).<sup>d</sup> Ref. [225] (A) (±0.2).<sup>e</sup> Ref. [228] (±0.5).<sup>f</sup> Ref. [2] (±0.1).

TABLE 30.2. Hydrogen cyanide [35]

(Maximum Bubble Pressure-A)

Surface tension ( $\gamma = 20.62 - 0.1155t - 7 \times 10^{-5}t^2$ ) (±0.2)									
-13.3°	-10.0°	-5.0°	5.0°	10.0°	15.0°	18.0°	20.0°	22.0°	25.0 °C
22.16	21.78	21.20	20.02	19.45	18.89	18.56	18.33	18.12	17.78

TABLE 31. Saturated and unsaturated cyano-esters [39]  
 (Cap. Rise-A)

Compound	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_7$
	15°	25°	50°	75°	100°	120°	135°	150 °C	a	b	
Methyl cyanoacetate <sup>a</sup> .....	39.71	38.63	35.95	33.26	30.58	20.43	26.82	25.21	41.32	0.1074	$\pm 0.05$
Ethyl cyanoacetate.....	37.16	36.07	33.34	30.61	27.88	25.70	-----	-----	38.80	0.1092	$\pm 0.08$
Propyl cyanoacetate <sup>b</sup> .....	34.28	33.37	31.12	28.86	26.61	24.81	23.45	22.10	35.63	0.0902	$\pm 0.10$
Butyl cyanoacetate <sup>b</sup> .....	32.39	31.61	29.65	27.69	25.73	24.16	22.99	21.81	33.57	0.0784	$\pm 0.07$
Isobutyl cyanoacetate <sup>b</sup> .....	31.04	30.27	28.35	26.42	24.50	22.96	21.80	20.65	32.20	0.0770	$\pm 0.04$
Pentyl cyanoacetate <sup>b</sup> .....	30.10	29.43	27.76	26.08	24.41	23.07	22.06	21.06	31.11	0.0670	$\pm 0.10$
Ethyl 2-cyano-3-methylbutyrate.....	30.92	30.01	27.73	25.45	23.17	21.35	-----	-----	32.29	0.0912	$\pm 0.01$
Ethyl 2-cyano-3-methylvalerate.....	31.26	30.36	28.10	25.84	23.58	21.77	-----	-----	32.62	0.0904	$\pm 0.07$
Ethyl 2-cyano-3-ethylvalerate.....	31.42	30.50	28.20	25.90	23.60	21.76	-----	-----	32.80	0.0920	$\pm 0.03$
Ethyl 2-cyano-3-methylhexanoate.....	30.54	29.67	27.50	25.32	23.15	21.41	-----	-----	31.85	0.0870	$\pm 0.01$
Ethyl 2-cyano-3-ethylhexanoate.....	30.90	30.03	27.85	25.68	23.50	21.76	-----	-----	32.21	0.0871	$\pm 0.06$
Ethyl 2-cyano-3-propylhexanoate.....	30.53	29.67	27.51	25.35	23.19	21.46	-----	-----	31.83	0.0864	$\pm 0.08$
Ethyl 2-cyano-3-methyl-2-pentenoate.....	34.87	33.86	31.33	28.81	26.28	24.26	-----	-----	36.39	0.1011	$\pm 0.12$
Ethyl 2-cyano-3,3-diethylacrylate.....	34.00	33.02	30.58	28.15	25.71	23.76	-----	-----	35.46	0.0975	$\pm 0.02$
Ethyl 2-cyano-3-propylcrotonate.....	33.67	32.74	30.41	28.09	25.77	23.91	-----	-----	35.06	0.0929	$\pm 0.01$
Ethyl 2-cyano-3-propyl-2-pentenoate.....	32.23	31.30	28.97	26.65	24.32	22.46	-----	-----	33.63	0.0931	$\pm 0.08$
Ethyl 2-cyano-3,3-dipropylacrylate.....	32.91	31.94	29.49	27.05	24.61	22.66	-----	-----	34.38	0.0977	$\pm 0.06$

<sup>a</sup> Ref. [255] ( $\pm 0.20$ ).<sup>b</sup> Ref. [108] (Maximum Bubble Pressure- $N_2$ ) ( $\pm 2.0$ ).
 TABLE 32. Cyclopentane and cyclohexane derivatives [246]  
 (Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Cyclopentyl methyl ether.....	27.00	26.43	25.29	24.16	23.02	21.89	-----	-----	-----	28.70	0.1135	$\pm 0.03$
Cyclopentyl ethyl ether.....	26.65	26.12	25.06	23.99	22.93	21.87	20.80	19.74	18.67	28.25	0.1064	$\pm 0.05$
Cyclopentyl formate.....	32.37	31.79	30.63	29.48	28.32	27.16	26.01	24.85	23.70	34.10	0.1156	$\pm 0.07$
Cyclopentyl acetate.....	-----	30.62	29.48	28.34	27.19	26.05	24.91	23.77	22.62	32.91	0.1143	$\pm 0.08$
Chlorocyclopentane.....	30.99	30.40	29.22	28.05	26.87	25.69	24.52	23.34	22.17	32.75	0.1176	$\pm 0.07$
Bromocyclopentane.....	33.90	33.31	32.14	30.97	29.79	28.62	27.45	26.28	25.10	35.66	0.1173	$\pm 0.09$
Iodocyclopentane.....	36.76	36.19	35.06	33.92	32.78	31.64	30.50	29.37	28.23	38.47	0.1138	$\pm 0.03$
Bicyclohexyl.....	33.21	32.74	31.79	30.84	29.88	28.93	27.98	27.03	26.08	34.64	0.0951	$\pm 0.09$
Cyclohexyl methyl ether.....	28.77	28.21	27.11	26.01	24.90	23.80	22.70	21.60	20.49	30.42	0.1103	$\pm 0.04$
Cyclohexyl ethyl ether.....	27.80	27.29	26.26	25.24	24.22	23.20	22.18	21.15	20.13	29.33	0.1022	$\pm 0.07$
Cyclohexyl formate.....	32.78	32.22	31.11	30.00	28.88	27.77	26.66	25.54	24.43	34.45	0.11132	$\pm 0.09$
Cyclohexyl acetate.....	-----	31.27	30.16	29.05	27.93	26.82	25.71	24.60	23.48	33.50	0.1113	$\pm 0.07$
Chlorocyclohexane.....	32.25	31.70	30.60	29.50	28.39	27.29	26.19	25.09	23.99	33.90	0.1101	$\pm 0.10$
Bromocyclohexane.....	-----	33.90	32.78	31.66	30.54	29.43	28.31	27.19	26.08	36.13	0.1117	$\pm 0.02$
Iodocyclohexane.....	36.81	36.25	35.13	34.02	32.90	31.79	30.67	29.56	28.44	38.48	0.1115	$\pm 0.30$

TABLE 33. Cyclopropane- and cyclobutane-carboxylic acids and some carboxylates  
(Capillary Rise-A)

Compound	Surface tension										Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Cyclopropanecarboxylic acid <sup>c</sup>		34.48	33.43	32.38	31.33	30.29	29.24	28.19	27.14	26.09	36.58	0.1049	±0.07
Cyclobutanecarboxylic acid <sup>c</sup>		33.62	32.59	31.57	30.54	29.52	28.49	27.47	26.44	25.42	35.67	0.1025	±0.09
Methyl 1,1-cyclopropanedicarboxylate <sup>a</sup>	37.59	36.41	35.23	34.05	32.87	31.69	30.51	28.74	28.15	26.97	38.77	0.1180	±0.02
Ethyl 1,1-cyclopropanedicarboxylate <sup>b</sup>	32.46	31.50	30.53	29.56	28.59	27.63	26.66	25.69	24.72	23.76	33.43	0.09673	±0.20
Diethyl 1,1-cyclopropanedicarboxylate <sup>c</sup>	32.83	31.76	30.69	29.63	28.56	27.50	26.43	25.37	24.30	23.24	33.89	0.1065	±0.11
Dipropyl 1,1-cyclopropanedicarboxylate <sup>c</sup>	31.99	30.99	29.99	28.99	27.99	26.99	25.99	24.99	23.99	22.99	32.99	0.1000	±0.20
Ethyl cyclobutanecarboxylate <sup>b</sup>	31.02	29.86	28.70	27.54	26.38	25.22	24.06	22.90	21.74	20.58	32.18	0.1160	±0.05
Methyl 1,1-cyclobutanedicarboxylate <sup>a</sup>	36.23	35.11	33.99	32.87	31.74	30.62	29.50	27.82	27.26	26.14	37.35	0.1121	±0.17
Dimethyl 1,1-cyclobutanedicarboxylate <sup>c</sup>	36.17	35.04	33.91	32.78	31.65	30.52	29.39	28.26	27.13	26.00	37.30	0.1130	±0.10
Ethyl 1,1-cyclobutanedicarboxylate <sup>b</sup>	33.04	31.94	30.84	29.74	28.63	27.53	26.43	25.33	24.23	23.13	34.14	0.1101	±0.03
Diethyl 1,1-cyclobutanedicarboxylate <sup>c</sup>	32.50	31.54	30.49	29.44	28.38	27.33	26.28	25.23	24.18	23.13	33.64	0.1051	±0.06
Dipropyl 1,1-cyclobutanedicarboxylate <sup>c</sup>	31.64	30.67	29.71	28.74	27.78	26.82	25.85	24.89	23.92	22.96	32.60	0.0964	±0.04
Dibutyl 1,1-cyclobutanedicarboxylate <sup>c</sup>	31.20	30.28	29.35	28.42	27.49	26.57	25.64	24.71	23.79	22.86	32.13	0.0927	±0.16
Methyl 1,1-cyclopentanedicarboxylate <sup>a</sup>	36.34	35.21	34.09	32.96	31.83	30.70	29.57	27.88	27.32	26.19	37.47	0.1128	±0.03
Methyl 1,1-cyclohexanedicarboxylate <sup>a</sup>	36.54	35.47	34.41	33.34	32.28	31.22	30.15	28.56	28.02	26.96	37.70	0.1064	±0.11
Ethyl 1,1-cyclopropanedicarboxylate <sup>b</sup>	33.57	32.53	31.48	30.44	29.39	28.35	27.30	26.26	25.21	24.17	34.62	0.1045	±0.06
Ethyl <i>trans</i> -3,3-dimethyl-1,2-cyclopropanedicarboxylate <sup>b</sup>	31.68	30.65	29.61	28.58	27.55	26.52	25.49	24.45	23.42	22.39	32.71	0.1032	±0.08
Ethyl 1,1,2,2-cyclopropanetetra-carboxylate <sup>b</sup>					31.51	30.57	29.63	28.69	27.75	26.81	36.21	0.09398	±0.01
Methyl 3-methyl-2-cyclopropene-1,2-dicarboxylate <sup>b</sup>					34.51	33.29	32.07	30.86	29.64	28.42	40.60	0.1218	±0.04
Ethyl 3-methyl-2-cyclopropene-1,2-dicarboxylate <sup>b</sup>				31.55	30.46	29.38	28.30	27.22	26.14	25.06	35.87	0.1081	±0.04
Labile Ethyl 3-methyl-2-cyclopropene-1,2-dicarboxylate <sup>b</sup>			33.50	32.32	31.15	29.98	28.80	27.63	26.45	25.28	37.02	0.1174	±0.01
Ethyl 1-cyano-1-cyclobutanecarboxylate <sup>b</sup>							29.44	28.36	27.29	26.22	36.94	0.1072	±0.13

<sup>a</sup> Ref. [234] (A) (±0.10).<sup>c</sup> Ref. [115] (A) (±0.10).<sup>b</sup> Ref. [220] (Maximum Bubble Pressure-A) (±0.10).

TABLE 34. Dialkyl carbonates [194]  
 (Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.15$ )										Least squares constants		$\sigma_7$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Ethyl propyl carbonate...	27.11	26.60	26.10	25.60	24.59	23.58	22.57	21.56	20.56	19.55	28.62	0.1008	$\pm 0.05$
Butyl ethyl carbonate...	27.17	26.59	26.22	25.75	24.81	23.86	22.92	21.98	21.04	20.07	28.58	0.0942	$\pm 0.06$
Ethyl pentyl carbonate...	27.51	27.03	26.56	26.09	25.15	24.20	23.26	22.32	21.38	20.43	28.92	0.0943	$\pm 0.02$
Ethyl hexyl carbonate...	28.14	27.66	27.18	26.70	25.74	24.78	23.83	22.87	21.91	20.95	29.58	0.0959	$\pm 0.06$
Butyl propyl carbonate...	27.41	26.93	26.46	25.99	25.05	24.10	23.16	22.22	21.28	19.33	28.82	0.0943	$\pm 0.05$
Dipentyl carbonate...	27.88	27.47	27.06	26.64	25.82	24.99	24.16	23.34	22.51	21.69	29.12	0.0826	$\pm 0.22$
Diethyl carbonate...	28.48	28.06	27.63	27.21	26.36	25.50	24.65	23.80	22.95	22.10	29.76	0.0851	$\pm 0.03$
Dimethyl carbonate <sup>a</sup> ...	29.93	29.25	-----	27.91	26.57	25.22	23.88	-----	-----	-----	31.94	0.1343	$\pm 0.06$
Diethyl carbonate <sup>a</sup> ...	26.97	26.42	-----	25.32	24.22	23.12	22.02	20.92	19.82	18.72	28.62	0.1100	$\pm 0.09$
Dipropyl carbonate <sup>a</sup> ...	27.42	26.91	-----	25.89	24.88	23.86	22.85	21.83	20.82	19.80	28.94	0.1015	$\pm 0.07$
Dibutyl carbonate <sup>a</sup> ...	27.66	27.19	-----	26.25	25.31	24.37	23.43	22.49	21.55	20.61	29.07	0.0940	$\pm 0.05$
Diisobutyl carbonate <sup>a</sup> ...	25.78	25.31	-----	24.39	23.96	22.53	21.60	20.67	19.75	18.82	27.17	0.0928	$\pm 0.02$

<sup>a</sup> Ref. [250].
 TABLE 35. Alkyl alkylxanthates [250]  
 (Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_7$
	15°	25°	35°	45°	55°	65°	75°	85 °C	a	b	
Ethyl ethylxanthate.....	34.78	33.72	32.66	31.61	30.55	29.50	28.44	27.38	36.36	0.1056	$\pm 0.11$
Propyl propylxanthate.....	33.34	32.37	31.40	30.43	29.45	28.48	27.51	26.54	34.80	0.0972	$\pm 0.01$
Butyl ethylxanthate.....	33.25	32.31	31.38	30.45	29.51	28.58	27.64	26.71	34.65	0.0934	$\pm 0.06$
Ethyl butylxanthate.....	33.38	32.41	31.45	30.48	29.52	28.55	27.58	26.62	34.83	0.0966	$\pm 0.18$
Butyl butylxanthate.....	32.34	31.43	30.53	29.62	28.72	27.81	26.90	26.00	33.70	0.09063	$\pm 0.09$

 TABLE 36. Dodecanols [69]  
 (Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.20$ )								Least squares constants	
	20°	25°	30°	40°	50°	60°	70°	80 °C	a	b
Dodecyl alcohol.....	-----	29.41	28.96	28.29	27.51	26.75	26.02	25.27	31.25	0.0748
2-Dodecanol.....	29.16	-----	28.24	27.46	26.57	25.83	25.13	24.35	30.66	0.0798
3-Dodecanol.....	28.60	-----	27.65	26.92	26.06	25.35	24.49	23.75	30.12	0.0801
4-Dodecanol.....	27.83	-----	26.94	26.17	25.41	24.58	23.83	23.02	29.34	0.0796
5-Dodecanol.....	27.45	-----	26.54	25.80	25.03	24.17	23.34	22.60	29.02	0.0806
6-Dodecanol.....	-----	-----	26.29	25.34	24.57	23.83	23.02	22.21	28.63	0.0803



TABLE 37. Esters of normal dibasic acids and of substituted malonic acids [243]

(Differential Capillary Rise-A)

Ester	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_7$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Dimethyl malonate <sup>a</sup> .....	38.51	37.37	36.10	34.89	33.68	32.47	31.26	30.06	28.85	27.64	39.79	0.1208	$\pm 0.14$
Diethyl malonate <sup>a</sup> .....	32.87	31.83	30.78	29.74	28.70	27.66	26.62	25.57	24.53	23.49	33.91	0.1042	$\pm 0.05$
Dipentyl malonate <sup>b</sup> .....	28.7	28.3	27.5	26.7	25.9	25.1	24.3	23.5	22.7	21.9	29.9	0.0800	$\pm 0.60$
Dimethyl succinate.....	37.81	36.62	35.43	34.24	33.04	31.85	30.66	29.47	28.28	27.09	39.00	0.1191	$\pm 0.16$
Diethyl succinate.....	32.93	31.89	30.85	29.81	28.76	27.72	26.68	25.64	24.60	23.56	33.97	0.1041	$\pm 0.08$
Dipropyl succinate.....	31.61	30.68	29.75	28.82	27.89	26.97	26.04	25.11	24.18	23.25	32.54	0.0929	$\pm 0.20$
Diisopropyl succinate.....	29.17	28.24	27.31	26.38	25.45	24.53	23.60	22.67	21.74	20.81	30.10	0.0929	$\pm 0.07$
Dibutyl succinate.....	31.57	30.65	29.72	28.80	27.87	26.94	26.02	25.09	24.17	23.24	32.50	0.0926	$\pm 0.03$
Diisobutyl succinate.....	29.30	28.45	27.60	26.75	25.89	25.04	24.19	23.34	22.49	21.64	30.15	0.0851	$\pm 0.08$
Dipentyl succinate.....	31.07	30.27	29.47	28.67	27.86	27.06	26.26	25.46	24.66	23.86	31.87	0.0801	$\pm 0.09$
Diisopentyl succinate.....	30.78	29.92	29.07	28.21	27.36	26.51	25.65	24.80	23.94	23.09	31.63	0.0854	$\pm 0.06$
Dimethyl glutarate.....		36.21	35.03	33.85	32.67	31.50	30.32	29.14	27.96		38.57	0.1179	$\pm 0.04$
Diethyl glutarate.....	33.33	32.32	31.31	30.30	29.29	28.28	27.27	26.26	25.25	24.24	34.34	0.1010	$\pm 0.03$
Diethyl malate <sup>c</sup> .....	38.76	37.14	35.51	33.88	32.25	30.63					40.39	0.1627	$\pm 0.30$
Dipentyl malate <sup>c</sup> .....	29.37	28.63	27.96	27.29	26.62	25.95					29.97	0.0670	$\pm 0.30$
Dimethyl adipate.....	37.12	35.98	34.85	33.71	32.57	31.43	30.29	29.16	28.02	26.88	38.26	0.1138	$\pm 0.09$
Diethyl adipate.....	33.42	32.38	31.33	30.28	29.23	28.19	27.14	26.09	25.05	24.00	34.47	0.1047	$\pm 0.10$
Dipropyl adipate.....	32.81	31.83	30.84	29.86	28.88	27.90	26.92	25.93	24.95	23.97	33.79	0.0982	$\pm 0.08$
Diisopropyl adipate.....	30.31	29.33	28.34	27.36	26.37	25.39	24.40	23.42	22.43	21.45	31.30	0.0985	$\pm 0.13$
Dibutyl adipate.....	32.26	31.37	30.47	29.58	28.68	27.79	26.89	26.00	25.10	24.21	33.16	0.0895	$\pm 0.06$
Dipentyl adipate.....	32.11	31.25	30.38	29.51	28.64	27.78	26.91	26.04	25.18	24.31	32.98	0.0867	$\pm 0.05$
Diisopentyl adipate.....	30.95	30.10	29.26	28.41	27.57	26.73	25.88	25.04	24.19	23.35	31.79	0.0844	$\pm 0.07$
Dimethyl suberate.....	36.75	35.65	34.54	33.43	32.32	31.22	30.11	29.00	27.90	26.79	37.86	0.1107	$\pm 0.14$
Diethyl suberate.....	33.57	32.60	31.62	30.65	29.68	28.71	27.74	26.76	25.79	24.81	34.54	0.0973	$\pm 0.03$
Dipropyl suberate.....	32.78	31.87	30.96	30.05	29.14	28.24	27.33	26.42	25.51	24.60	33.69	0.0909	$\pm 0.04$
Dibutyl suberate.....	32.59	31.69	30.78	29.88	28.98	28.08	27.18	26.27	25.37	24.47	33.49	0.0902	$\pm 0.09$
Diethyl sebacate.....	33.72	32.76	31.80	30.84	29.88	28.93	27.97	27.01	26.05	25.09	34.68	0.0959	$\pm 0.09$
Dipropyl sebacate.....	33.32	32.38	31.45	30.52	29.58	28.65	27.72	26.79	25.85	24.92	34.25	0.0933	$\pm 0.09$
Diisopentyl sebacate <sup>d</sup> .....	31.91	31.11	30.30	29.50	28.69	27.89	27.08	26.28	25.47	24.67	32.72	0.0805	$\pm 0.02$
Dimethyl pimelate <sup>a</sup> .....	36.60	35.57	34.53	33.49	32.45	31.42	30.38	29.34	28.31		37.64	0.1037	$\pm 0.06$
Dimethyl azelate <sup>a</sup> .....	36.38	35.32	34.25	33.19	32.12	31.06	29.99	28.93	27.86		37.45	0.1065	$\pm 0.07$
Diethyl oxalate.....	33.20	32.08	30.96	29.84	28.72	27.61	26.49	25.37	24.25	23.13	34.32	0.1119	$\pm 0.05$
Dipropyl oxalate.....	31.18	30.19	29.20	28.21	27.22	26.23	25.24	24.23	23.26	22.27	32.17	0.09898	$\pm 0.09$
Diisopropyl oxalate.....	29.44	28.43	27.42	26.41	25.39	24.38	23.37	22.36	21.35	20.34	30.45	0.1011	$\pm 0.14$
Dibutyl oxalate.....	30.54	29.63	28.72	27.81	26.89	25.98	25.07	24.16	23.25	22.34	31.45	0.0911	$\pm 0.02$
Dipentyl oxalate.....	30.55	29.67	28.78	27.90	27.02	26.14	25.26	24.37	23.49	22.61	31.43	0.0882	$\pm 0.06$
Diisopentyl oxalate.....	28.89	28.09	27.28	26.48	25.67	24.86	24.06	23.25	22.45	21.64	29.70	0.0806	$\pm 0.02$
Methyl dimethyl-malonate <sup>a</sup> .....	32.15	31.04	29.92	28.81	27.69	26.58	25.46	24.35	23.23		33.27	0.1115	$\pm 0.01$
Methyl diethyl-malonate <sup>a</sup> .....	32.13	31.04	29.95	28.86	27.77	26.69	25.60	24.51	23.42		33.22	0.1089	$\pm 0.06$
Methyl ethylpropyl-malonate <sup>c</sup> .....	31.55	30.53	29.51	28.49	27.46	26.44	25.42	24.40	23.38		32.57	0.1021	$\pm 0.03$
Methyl dipropyl-malonate <sup>a</sup> .....	30.23	29.34	28.46	27.58	26.69	25.81	24.93	24.05	23.16		31.11	0.0883	$\pm 0.14$
Dimethyl methyl-malonate.....	34.71	33.51	32.31	31.11	29.90	28.70	27.50	26.30	25.10	23.90	35.91	0.1201	$\pm 0.09$
Diethyl methylmalonate.....	31.00	29.95	28.89	27.83	26.77	25.72	24.66	23.60	22.55	21.49	32.06	0.1057	$\pm 0.07$
Dipropyl methyl-malonate.....	30.09	29.11	28.12	27.14	26.16	25.18	24.20	23.21	22.23	21.25	31.07	0.0982	$\pm 0.05$
Dibutyl methylmalonate.....		28.81	27.90	26.99	26.08	25.18	24.27	23.36	22.45	21.60	30.63	0.0909	$\pm 0.06$
Dimethyl ethylmalonate.....	33.52	32.38	31.25	30.11	28.97	27.83	26.69	25.56	24.42	23.28	34.66	0.1138	$\pm 0.06$
Diethyl ethylmalonate.....	30.53	29.51	28.50	27.48	26.46	25.44	24.42	23.41	22.39	21.37	31.55	0.1018	$\pm 0.10$
Dipropyl ethyl-malonate.....	29.93	28.99	28.04	27.10	26.15	25.20	24.26	23.31	22.37	21.42	30.88	0.0946	$\pm 0.13$
Dibutyl ethylmalonate.....	29.71	28.79	27.88	26.97	26.05	25.14	24.23	23.32	22.40	21.49	30.62	0.0913	$\pm 0.09$

TABLE 37. Esters of normal dibasic acids and of substituted malonic acids [243]—Continued

Ester	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_T$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Dimethyl propyl-malonate.....	32.37	31.33	30.28	29.24	28.19	27.14	26.10	25.05	24.01	22.96	33.42	0.1046	$\pm 0.07$
Diethyl propyl-malonate.....		28.93	27.96	26.98	26.00	25.02	24.04	23.07	22.09	21.10	30.89	0.0979	$\pm 0.07$
Dipropyl propyl-malonate.....		28.68	27.74	26.81	25.88	24.95	24.02	23.08	22.15	21.22	30.54	0.0932	$\pm 0.09$
Dibutyl propylmalonate.....		28.39	27.54	26.68	25.82	24.96	24.10	23.25	22.39	21.53	30.11	0.0858	$\pm 0.03$
Dimethyl pentyl-malonate.....	31.44	30.50	29.55	28.60	27.65	26.71	25.76	24.81	23.87	22.92	32.39	0.0947	$\pm 0.06$
Diethyl pentylmalonate.....	29.38	28.53	27.68	26.83	25.98	25.14	24.29	23.44	22.59	21.74	30.23	0.0849	$\pm 0.20$
Dipropyl pentyl-malonate.....	29.58	28.69	27.79	26.90	26.01	25.12	24.23	23.33	22.44	21.55	30.47	0.0892	$\pm 0.02$
Dibutyl pentylmalonate.....		28.44	27.61	26.77	25.94	25.10	24.27	23.44	22.60	21.77	30.11	0.08342	$\pm 0.02$
Diethyl bromo-malonate <sup>i</sup> .....	33.82	33.08	32.34	31.60	30.86	30.12	29.38	28.64	27.90	27.16	34.56	0.07403	$\pm 0.35$
Diethyl benzyl-malonate <sup>i</sup> .....	35.84	35.04	34.24	33.45	32.65	31.85	31.05	30.25	29.45	28.65	36.64	0.07985	$\pm 0.33$
Diethyl <i>O</i> -propionyl-malate.....				29.18	28.30	27.43	26.55	25.68	24.80	23.93	32.68	0.0875	$\pm 0.12$
Diethyl <i>O</i> -butyryl- <i>l</i> -malate <sup>c</sup> .....	31.71	30.77	29.83	28.89	27.95	27.02	26.08	25.14	24.20	23.26	32.65	0.0939	$\pm 0.05$
Diethyl <i>O</i> -valeryl- <i>l</i> -malate <sup>f</sup> .....	30.65	29.81	28.97	28.13	27.28	26.44	25.60	24.76	23.92	23.08	31.49	0.0841	$\pm 0.24$
Diethyl <i>O</i> -hexanoyl- <i>l</i> -malate <sup>g</sup> .....	30.75	29.85	28.95	28.05	27.15	26.25	25.35	24.45	23.55	22.65	31.65	0.0900	$\pm 0.12$
Diethyl <i>O</i> -heptanoyl- <i>l</i> -malate <sup>f</sup> .....	30.69	29.84	28.99	28.14	27.29	26.44	25.59	24.74	23.89	23.04	31.54	0.08497	$\pm 0.13$
Diethyl <i>O</i> -octanoyl- <i>l</i> -malate <sup>f</sup> .....	30.53	29.70	28.88	28.05	27.22	26.39	25.56	24.73	23.91	23.06	31.36	0.08283	$\pm 0.01$
Diethyl <i>O</i> -nonanoyl- <i>l</i> -malate <sup>f</sup> .....	31.31	30.41	29.51	28.62	27.72	26.82	25.92	25.02	24.12	23.21	32.21	0.08987	$\pm 0.45$
Diethyl <i>O</i> -decanoyl- <i>l</i> -malate <sup>f</sup> .....	30.74	29.91	29.09	28.27	27.45	26.62	25.80	24.98	24.16	23.33	31.56	0.08225	$\pm 0.17$
Dimethyl <i>dextro</i> -tartrate <sup>b</sup> .....						39.17	28.24	37.31	36.38	35.45	44.75	0.09299	$\pm 0.04$
Dimethyl <i>DL</i> -tartrate <sup>b</sup> .....									35.15	34.23	43.44	0.0921	$\pm 0.03$
Diethyl <i>dextro</i> -tartrate <sup>i</sup> .....		37.97	36.97	35.97	34.96	33.96	32.96	31.96	30.95	29.95	39.98	0.1003	$\pm 0.14$

<sup>a</sup> Ref. [234] (A) ( $\pm 0.1$ ).<sup>b</sup> Ref. [133] (A) (Drop Weight-A) ( $\pm 0.3$ ).<sup>c</sup> Ref. [132] (A) (Drop Weight-A) ( $\pm 0.3$ ).<sup>d</sup> Ref. [256] (A) ( $\pm 0.3$ ).<sup>f</sup> Ref. [95] (A) ( $\pm 0.3$ ).<sup>g</sup> Ref. [179] (A) ( $\pm 0.3$ ).<sup>h</sup> Ref. [157] (A).<sup>i</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).

TABLE 38.1. Isomeric esters (C<sub>16</sub>) [171]

(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.1$ )					Least squares constants	
	25°	35°	45°	55°	65 °C	a	b
Methyl pentadecanoate.....	29.38	28.56	27.75	25.93	26.11	31.43	0.08186
Ethyl myristate.....	29.27	28.26	27.24	26.23	25.21	31.81	0.1015
Propyl tridecanoate.....	28.84	27.92	27.00	26.08	25.16	31.14	0.0920
Butyl dodecanoate <sup>a</sup> .....	28.33	27.54	26.76	25.98	25.19	30.29	0.07844
Pentyl undecanoate.....	28.20	27.37	26.54	25.72	24.89	30.26	0.08256
Hexyl decanoate.....	28.29	27.36	26.43	25.50	24.57	30.61	0.0929
Heptyl nonanoate.....	28.14	27.29	26.44	25.59	24.74	30.26	0.08492
Octyl octanoate.....	29.99	27.12	26.29	25.47	24.65	29.99	0.08222
Nonyl heptanoate.....	28.24	27.46	26.68	25.90	25.12	30.20	0.0782
Decyl hexanoate.....	28.59	27.66	26.72	25.79	24.85	30.93	0.09353
Undecyl valerate.....	28.45	27.64	26.83	26.03	25.22	30.46	0.08057
Dodecyl butyrate.....	28.89	28.03	27.17	26.31	25.45	31.04	0.0860
Tridecyl propionate.....	29.43	28.61	27.79	26.96	26.14	31.49	0.0823
Tetradecyl acetate.....	29.81	28.87	27.93	26.98	26.04	32.16	0.0941
Pentadecyl formate.....	30.42	29.49	28.56	27.62	26.69	32.76	0.09344

<sup>a</sup> For preferred values for butyl dodecanoate see table 9. The values given here are listed to maintain the consistency of treatment of these isomeric esters.

TABLE 38.2. Esters of cyclopropane- and cyclobutane-carboxylic acids [115]

(Capillary Rise Method-A)

Carboxylate	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Methyl cyclopropane.....		30.79	29.56	28.33	27.09	25.86	24.63	23.40	22.17	33.25	0.1231	$\pm 0.08$
Ethyl cyclopropane.....		29.08	27.94	26.79	25.64	24.49	23.34	22.20	21.05	31.38	0.1148	$\pm 0.08$
Propyl cyclopropane.....		29.00	27.89	26.78	25.67	24.57	23.46	22.35	21.25	31.21	0.1107	$\pm 0.11$
Butyl cyclopropane.....		28.91	27.89	26.87	25.85	24.84	23.82	22.80	21.79	30.94	0.1017	$\pm 0.04$
Pentyl cyclopropane.....	29.63	29.12	28.09	27.07	26.05	25.03	24.01	22.98	21.96	31.16	0.1022	$\pm 0.08$
Butyl cyclobutane.....	29.83	29.35	28.37	27.39	26.41	25.44	24.46	23.48	22.51	31.30	0.0977	$\pm 0.07$
Pentyl cyclobutane.....	29.82	29.34	28.38	27.42	26.46	25.50	24.54	23.58	22.62	31.26	0.0960	$\pm 0.11$
Methyl cyclobutane.....		30.79	29.60	28.41	27.21	26.02	24.83	23.64	22.45	33.17	0.1191	$\pm 0.18$
Propyl cyclobutane.....	29.67	29.15	28.10	27.06	26.01	24.97	23.92	22.88	21.83	31.24	0.1045	$\pm 0.05$

TABLE 38.3. Esters of orthoformic acid [250]

(Capillary Rise Method-A)

Orthoformate	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_7$
	15°	25°	35°	45°	55°	65°	75°	85 °C	a	b	
Ethyl.....	24.09	23.10	22.11	21.12	20.14	19.15	18.16	17.17	25.57	0.0900	$\pm 0.11$
Propyl.....	25.25	24.34	23.42	22.50	21.59	20.67	19.75	18.84	26.63	0.0917	$\pm 0.04$
Butyl.....	26.05	25.18	24.32	23.45	22.59	21.72	20.85	19.99	27.35	0.0866	$\pm 0.09$

TABLE 39. Esters of 3,3-disubstituted glutaric acids [235]

(Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_7$	
	15°	25°	35°	45°	55°	65°	75°	85 °C	a	b		
Methyl 3-methylglutarate.....		33.17	32.12	31.06	30.01	28.95	27.90	26.84	35.81	0.1055	$\pm 0.04$	
Methyl 3,3-dimethylglutarate.....		30.93	29.96	28.99	28.02	27.05	26.08	25.11	33.36	0.0971	$\pm 0.02$	
Methyl 3-ethyl-3-methylglutarate.....		31.54	30.55	29.56	28.57	27.58	26.59	25.60	34.01	0.0989	$\pm 0.12$	
Methyl 3,3-diethylglutarate.....		31.29	30.40	29.51	28.62	27.73	26.84	25.95	33.52	0.0890	$\pm 0.00$	
Methyl 3-methyl-3-propylglutarate.....		30.74	29.83	28.91	27.99	27.07	26.15	25.24	33.04	0.0918	$\pm 0.00$	
Methyl 3-ethyl-3-propylglutarate.....		30.93	30.03	29.13	28.23	27.33	26.43	25.53	33.18	0.0900	$\pm 0.03$	
Methyl 3,3-dipropylglutarate.....		30.04	29.15	28.26	27.37	26.48	25.59	24.70	32.27	0.0891	$\pm 0.10$	
Methyl 1,1-cyclopentane-diacetate.....		34.85	33.80	32.74	31.68	30.62	29.56	28.51	37.50	0.1058	$\pm 0.04$	
Methyl 3-methyl-1,1-cyclopentane-diacetate.....			32.12	31.25	30.39	29.52	28.66	27.79	26.93	34.28	0.0865	$\pm 0.06$
Methyl 1,1-cyclohexane-diacetate.....		35.31	34.34	33.37	32.40	31.43	30.46	29.49	37.74	0.0971	$\pm 0.06$	
Methyl 3-methyl-1,1-cyclohexane-diacetate.....			32.94	32.10	31.26	30.43	29.59	28.75	27.91	35.04	0.0839	$\pm 0.18$
Methyl 4-methyl-1,1-cyclohexane-diacetate.....	33.68	32.89	32.10	31.31	30.51	29.72	28.93	28.14	34.87	0.0792	$\pm 0.02$	
Methyl <i>trans</i> -decahydro-2,2-naphthalenediacetate.....	36.88	35.93	34.97	34.02	33.07	32.12	31.16	30.21	38.31	0.0953	$\pm 0.08$	
Methyl <i>trans</i> -hexahydro-2,2-indandiacetate.....		35.20	34.27	33.39	32.41	31.48	30.55	29.62	37.53	0.0930	$\pm 0.03$	
Ethyl 3,3-dimethylglutarate.....	30.11	29.18	28.25	27.32	26.39	25.46	24.53	23.60	31.51	0.0930	$\pm 0.13$	
Ethyl 1,1-cyclopentane-diacetate.....	33.40	32.41	31.42	30.43	29.43	28.44	27.45	26.46	34.89	0.0992	$\pm 0.08$	
Ethyl 3-methyl-1,1-cyclopentane-diacetate.....	31.55	30.68	29.81	28.94	28.06	27.19	26.32	25.45	32.86	0.0872	$\pm 0.01$	
Ethyl 1,1-cyclohexane-diacetate.....	33.93	32.98	32.04	31.10	30.16	29.22	28.27	27.33	35.34	0.0942	$\pm 0.04$	
Ethyl 3-methyl-1,1-cyclohexane-diacetate.....		31.26	30.33	29.40	28.48	27.55	26.62	25.69	33.58	0.0928	$\pm 0.04$	
Ethyl 4-methyl-1,1-cyclohexane-diacetate.....	32.18	31.30	30.42	29.54	28.66	27.78	26.90	26.02	33.50	0.0880	$\pm 0.03$	
Ethyl <i>trans</i> -hexahydro-2,2-indandiacetate.....		33.44	32.51	31.59	30.66	29.74	28.81	27.89	35.75	0.0925	$\pm 0.09$	
Ethyl <i>trans</i> -decahydro-2,2-naphthalenediacetate.....		33.92	32.98	32.04	31.09	30.15	29.21	28.27	36.27	0.0941	$\pm 0.12$	

TABLE 40.1 Ethers [242]  
(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$	
	15°	25°	30°	40°	50°	60°	70°	80°	90 °C	a	b		
Ethyl methyl ether <sup>d</sup> .....	16.58	15.27	14.61	13.29	11.97	-----	-----	-----	-----	-----	18.56	0.1317	$\pm 0.04$
Ethyl propyl ether <sup>d</sup> .....	20.34	19.28	18.76	17.70	16.65	15.60	-----	-----	-----	-----	21.92	0.1054	$\pm 0.01$
Diethyl ether.....	17.56	16.65	16.20	-----	-----	-----	-----	-----	-----	-----	18.92	0.0908	$\pm 0.00$
Dipropyl ether.....	21.03	19.98	19.46	18.41	17.36	16.32	-----	-----	-----	-----	22.60	0.1047	$\pm 0.00$
Diisopropyl ether.....	18.32	17.27	16.75	15.70	14.65	13.60	-----	-----	-----	-----	19.89	0.1048	$\pm 0.03$
Dibutyl ether.....	23.38	22.44	21.98	21.04	20.11	19.18	18.24	17.31	16.37	24.78	0.0934	-----	$\pm 0.08$
Dipentyl ether.....	25.27	24.35	23.88	22.96	22.03	21.11	20.18	19.26	18.22	26.66	0.0925	-----	$\pm 0.09$
Diisopentyl ether.....	23.45	22.58	22.15	21.28	20.40	19.53	18.66	17.79	16.92	24.76	0.0871	-----	$\pm 0.04$
Dihexyl ether.....	26.21	25.35	24.93	24.07	23.21	22.35	21.50	20.64	19.78	27.50	0.0858	-----	$\pm 0.07$
Diheptyl ether.....	27.42	26.56	26.14	25.28	24.43	23.58	22.72	21.87	21.01	28.70	0.0854	-----	$\pm 0.03$
Dioctyl ether.....	-----	27.31	26.90	26.07	25.24	24.41	23.58	22.75	21.92	29.39	0.0830	-----	$\pm 0.04$
Butyl methyl ether.....	20.58	19.53	19.00	17.94	-----	-----	-----	-----	-----	-----	22.17	0.1057	$\pm 0.06$
Butyl ethyl ether.....	21.18	20.13	19.60	18.55	17.50	16.46	-----	-----	-----	-----	22.75	0.1049	$\pm 0.02$
Methyl pentyl ether.....	22.43	21.39	20.87	19.83	18.79	17.75	-----	-----	-----	-----	23.99	0.1040	$\pm 0.01$
Ethyl pentyl ether.....	22.70	21.71	21.21	20.22	19.23	18.24	17.25	16.25	15.26	24.19	0.0992	-----	$\pm 0.18$
Hexyl methyl ether.....	23.71	22.72	22.22	21.23	20.24	19.25	18.26	17.26	16.27	25.20	0.0992	-----	$\pm 0.06$

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_7$	
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	a		b
Ethyl hexyl ether.....	22.46	-----	21.70	21.33	20.57	19.82	19.07	18.31	17.56	16.80	23.59	0.0754	$\pm 0.40$
Bis(2-ethoxyethyl) ether.....	27.98	-----	26.80	26.21	25.04	23.86	22.68	21.51	20.33	19.16	29.74	0.1176	$\pm 0.35$
Bis[2-(2-methoxyethoxy)-ethyl] ether.....	34.42	-----	33.41	32.90	31.88	30.86	29.85	28.83	27.81	26.80	35.95	0.1017	$\pm 0.02$
Anisole.....	36.30	-----	35.10	34.50	33.29	32.09	30.89	29.68	28.48	27.27	38.11	0.1204	$\pm 0.13$
Phenetole.....	34.51	-----	32.41	31.86	30.75	29.65	28.55	27.44	26.34	25.23	35.17	0.1104	$\pm 0.12$
Phenyl propyl ether.....	32.69	-----	31.63	31.10	30.05	28.99	27.93	26.88	25.82	24.77	34.27	0.1056	$\pm 0.03$
Isopropyl phenyl ether.....	31.34	-----	30.28	29.76	28.70	27.65	26.60	25.54	24.49	23.43	32.92	0.1054	$\pm 0.07$
Butyl phenyl ether.....	31.93	-----	30.97	30.48	29.52	28.55	27.59	26.62	25.66	24.69	33.38	0.09653	$\pm 0.07$
Pentyl phenyl ether.....	32.19	-----	31.25	30.78	29.85	28.91	27.98	27.04	26.11	25.17	33.59	0.0935	$\pm 0.01$
Hexyl phenyl ether.....	31.66	-----	30.79	30.35	29.48	28.61	27.73	26.86	25.99	25.12	32.97	0.08725	$\pm 0.05$
Allyl phenyl ether.....	34.44	-----	33.35	32.80	31.71	30.61	29.51	28.43	27.34	26.24	36.08	0.1093	$\pm 0.03$
<i>p</i> -Methylanisole <sup>b</sup> .....	34.59	-----	33.52	32.99	31.92	30.84	29.77	28.70	27.63	26.56	36.20	0.1071	-----
Phenyl ether <sup>c</sup> .....	27.53	-----	26.77	26.36	25.58	24.80	24.02	23.24	-----	-----	28.70	0.0780	-----
Anethol <sup>a</sup> .....	35.59	35.14	34.69	34.24	33.35	32.45	31.56	30.66	29.77	28.87	36.93	0.0895	$\pm 0.30$

<sup>a</sup> Ref. [13] (Capillary Rise Method-V) ( $\pm 1.5$ ).<sup>b</sup> Ref. [192] ( $\pm 0.2$ ).<sup>c</sup> Ref. [43] (Maximum Bubble Pressure-A) ( $\pm 0.2$ ).<sup>d</sup> Ref. [179] (Capillary Rise Method-A) ( $\pm 0.5$ ).

TABLE 40.2. Oximes [251]  
 (Maximum Bubble Pressure Method-A)

Oxime	Surface tension ( $\pm 0.15$ )										Least squares constants		$\sigma_s$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>	
Acetone <i>O</i> -methyloxime.....	23.38	22.85	22.31	21.78	20.72						24.97	0.1062	$\pm 0.00$
Acetone <i>O</i> -ethyloxime.....	23.03	22.48	21.93	21.38	20.28	19.18	18.08				24.68	0.1100	$\pm 0.01$
Acetone <i>O</i> -propyloxime.....	24.19	23.65	23.12	22.59	21.52	20.45	19.38				25.79	0.1068	$\pm 0.03$
2-Butanone <i>O</i> -ethyl-oxime.....	24.29	23.75	23.20	22.66	21.58	20.49	19.40	18.32	17.23	16.15	25.92	0.1086	$\pm 0.06$
2-Butanone <i>O</i> -propyl-oxime.....	24.47	23.95	23.43	22.91	21.88	20.84	19.81	18.77	17.74	16.70	26.02	0.1035	$\pm 0.04$
3-Pentanone <i>O</i> -ethyl-oxime.....	24.28	23.78	23.27	22.77	21.76	20.75	19.75	18.74	17.73	16.73	25.79	0.1007	$\pm 0.08$
3-Pentanone <i>O</i> -propyl-oxime.....	25.23	24.73	24.24	23.74	22.75	21.76	20.77	19.78	18.79	17.80	26.71	0.09899	$\pm 0.05$
2-Pentanone <i>O</i> -ethyl-oxime.....	24.04	23.56	23.08	22.59	21.63	20.66	19.70	18.73	17.77	16.80	25.49	0.0965	$\pm 0.06$
2-Pentanone <i>O</i> -propyl-oxime.....	25.13	24.63	24.13	23.64	22.64	21.64	20.64	19.64	18.65	17.65	26.63	0.0998	$\pm 0.14$
3-Hexanone <i>O</i> -ethyl-oxime.....	24.74	24.25	23.76	23.28	22.30	21.32	20.34	19.36	18.39	17.41	26.21	0.0978	$\pm 0.04$
3-Hexanone <i>O</i> -propyl-oxime.....	25.49	25.00	24.50	23.98	23.01	22.02	21.03	20.04	19.05	18.05	26.98	0.09918	$\pm 0.09$
4-Heptanone <i>O</i> -ethyl-oxime.....	25.26	24.76	24.25	23.75	22.74	21.73	20.73	19.72	18.71	17.71	26.77	0.1007	$\pm 0.13$
4-Heptanone <i>O</i> -propyl-oxime.....		24.96	24.50	24.04	23.13	22.21	21.30	20.38	19.47	18.55	26.79	0.0915	$\pm 0.12$

 TABLE 41. Ethylenic compounds [114]  
 (Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_s$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>		
3-Butenoic acid.....	29.31	28.82	27.83	26.84	25.84	24.85	23.86	22.87	21.88	30.80	0.0991	$\pm 0.07$	
Methyl 3-butenolate.....	27.98	27.38	26.18	24.99	23.79	22.60				29.77	0.1195	$\pm 0.05$	
Ethyl 3-butenolate.....	26.71	26.16	25.05	23.95	22.84	21.73	20.63	19.52	18.42	28.37	0.1106	$\pm 0.05$	
Propyl 3-butenolate.....	26.81	26.29	25.25	24.22	23.18	22.14	21.11	20.07	19.04	28.36	0.1036	$\pm 0.03$	
Butyl 3-butenolate.....	27.07	26.58	25.59	24.61	23.62	22.63	21.65	20.66	19.68	28.55	0.0986	$\pm 0.03$	
Pentyl 3-butenolate.....	27.26	26.78	25.84	24.89	23.94	22.99	22.04	21.10	20.15	28.68	0.0948	$\pm 0.03$	
Methyl undecenoate.....	30.42	29.95	29.01	28.07	27.13	26.19	25.25	24.31	23.37	31.83	0.0940	$\pm 0.04$	
Ethyl undecenoate.....	29.69	29.24	28.34	27.45	26.55	25.65	24.76	23.86	22.97	31.03	0.0896	$\pm 0.04$	
Propyl undecenoate.....	29.95	29.49	28.57	27.64	26.72	25.80	24.87	23.95	23.02	31.34	0.0924	$\pm 0.03$	
Butyl undecenoate.....	30.05	29.61	28.74	27.86	26.98	26.10	25.22	24.35	23.47	31.37	0.0878	$\pm 0.07$	
2-Pentene.....	17.66	17.14	16.09							19.23	0.1047	$\pm 0.00$	
Methyl allylmalonate.....	33.11	32.57	31.49	30.40	29.32	28.24	27.15	26.07	24.98	34.74	0.1084	$\pm 0.06$	
Ethyl allylmalonate.....	30.15	29.65	28.65	27.65	26.64	25.64	24.64	23.64	22.64	31.65	0.1007	$\pm 0.10$	
Propyl allylmalonate.....		29.29	28.36	27.44	26.51	25.58	24.66	23.73	22.81	31.14	0.0926	$\pm 0.12$	
Butyl allylmalonate.....	29.42	28.98	28.10	27.22	26.33	25.45	24.57	23.69	22.81	30.74	0.0881	$\pm 0.07$	
Allyl acetate.....		26.36	25.17	23.99	22.80	21.61				28.73	0.1186	$\pm 0.08$	

TABLE 41. Ethylenic compounds [114]—Continued

Compound	Surface tension ( $\pm 0.10$ )									Least squares constants		$\sigma_T$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Allyl propionate	26.91	26.35	25.23	24.12	23.00	21.88	20.77	19.65	18.54	28.58	0.1116	$\pm 0.04$
Allyl butyrate	26.65	26.13	25.09	24.05	23.01	21.98	20.94	19.90	18.86	28.21	0.1039	$\pm 0.02$
Allyl succinate		33.70	32.65	31.60	30.55	29.51	28.46	27.41	26.37	35.79	0.1047	$\pm 0.06$
3-Chloropropene	24.08	23.61	22.66							25.50	0.0946	$\pm 0.06$
3-Bromopropene	27.56	26.94	25.68	24.42	23.16	21.91				29.45	0.1257	$\pm 0.03$
1,5-Hexadiene	19.39	18.87	17.85	16.82	15.79					20.93	0.1028	$\pm 0.07$
Dimethyl maleate	38.90	38.29	37.07	35.85	34.63	33.41	32.19	30.97	29.75	40.73	0.1220	$\pm 0.02$
Propyl fumarate	31.49	31.01	30.05	29.09	28.12	27.16	26.20	25.24	24.28	32.93	0.0961	$\pm 0.09$
Diethyl maleate	33.11	32.59	31.55	30.51	29.47	28.44	27.40	26.36	25.32	34.67	0.1039	$\pm 0.12$
Dipropyl maleate	32.46	31.96	30.96	29.96	28.96	27.96	26.96	25.96	24.96	33.96	0.1000	$\pm 0.13$
Dibutyl maleate		30.73	29.86	29.00	28.13	27.27	26.40	25.54	24.67	32.46	0.0865	$\pm 0.13$
Diisobutyl maleate		28.79	27.94	27.08	26.23	25.38	24.52	23.67	22.81	30.50	0.0854	$\pm 0.03$
Dipentyl maleate	31.24	30.81	29.95	29.09	28.22	27.36	26.50	25.64	25.08	32.53	0.0861	$\pm 0.02$
Diisopentyl maleate	20.97	28.60	27.06	27.11	26.37	25.63	24.88	24.14	23.39	30.09	0.0744	$\pm 0.09$
Ethyl fumarate	32.32	31.79	30.73	29.68	28.62	27.56	26.51	25.45	24.40	33.90	0.1056	$\pm 0.11$
Butyl fumarate	31.15	30.71	29.82	28.92	28.03	27.14	26.25	25.36	24.47	32.49	0.08916	$\pm 0.07$
Isobutyl fumarate		28.93	28.07	27.22	26.36	25.51	24.65	23.80	22.94	30.64	0.0855	$\pm 0.07$
Pentyl fumarate	31.11	30.69	29.84	28.99	28.14	27.30	26.45	25.60	24.76	32.38	0.0847	$\pm 0.04$
Isopentyl fumarate		29.33	28.51	27.69	26.87	26.05	25.23	24.41	23.59	30.97	0.0820	$\pm 0.06$
Methyl citraconate		36.34	35.13	33.93	32.72	31.51	30.31	29.10	27.90	38.75	0.1206	$\pm 0.08$
Ethyl citraconate		32.15	31.14	30.13	29.12	28.12	27.11	26.10	25.09	34.17	0.1009	$\pm 0.05$
Propyl citraconate		31.08	30.13	29.18	28.22	27.27	26.32	25.37	24.42	32.98	0.0951	$\pm 0.13$
Methyl mesaconate	35.86	35.27	34.08	32.90	31.72	30.54	29.36	28.17	26.99	37.63	0.1182	$\pm 0.13$
Ethyl mesaconate		31.54	30.52	29.50	28.48	27.47	26.45	25.43	24.42	33.57	0.1017	$\pm 0.13$
Propyl mesaconate	31.39	30.91	29.97	29.02	28.07	27.12	26.17	25.23	24.28	32.81	0.0948	$\pm 0.05$
Methyl pyrotartrate		33.21	32.11	31.01	29.90	28.80	27.70	26.60	25.49	35.42	0.1103	$\pm 0.08$
Ethyl pyrotartrate		29.80	28.82	27.85	26.87	25.89	24.92	23.94	22.97	31.75	0.0976	$\pm 0.02$
Propyl pyrotartrate		29.55	28.63	27.71	26.78	25.86	24.94	24.02	23.10	31.39	0.0921	$\pm 0.06$
Diethyl (bromomethyl)-malonate <sup>c</sup>	31.20	30.77	29.91	29.05	28.18	27.32	26.45	25.59	24.73	32.50	0.08636	$\pm 0.08$
Methyl crotonate		28.62	27.43	26.25	25.07	23.89	22.71	21.52	20.34	30.98	0.1182	$\pm 0.08$
Ethyl crotonate		27.18	26.11	25.05	23.98	22.91	21.85	20.78	19.72	29.31	0.1066	$\pm 0.05$
Propyl crotonate	28.36	27.83	26.78	25.72	24.67	23.62	22.56	21.51	20.45	29.94	0.1054	$\pm 0.06$
Butyl crotonate	28.32	27.84	26.88	25.92	24.96	24.01	23.05	22.09	21.13	29.76	0.0959	$\pm 0.07$
Pentyl crotonate	28.74	28.27	27.32	26.37	25.42	24.47	23.52	22.57	21.62	30.17	0.09505	$\pm 0.07$
Isopentyl crotonate		27.25	26.31	25.38	24.44	23.51	22.57	21.64	20.70	29.12	0.0935	$\pm 0.09$
Methyl cinnamate <sup>a</sup>				37.65	36.61	35.58	34.55	33.52	32.49	41.77	0.1031	$\pm 0.19$
Ethyl cinnamate		37.90	36.85	35.81	34.76	33.72	32.67	31.63	30.58	39.99	0.1045	$\pm 0.07$
Propyl cinnamate		36.59	35.62	34.65	33.68	32.71	31.74	30.77	29.80	38.53	0.0970	$\pm 0.07$
Butyl cinnamate		35.75	34.81	33.87	32.93	31.99	31.05	30.11	29.17	37.63	0.0940	$\pm 0.10$
Dimethyl chlorofumarate <sup>b</sup>		37.52	36.35	35.19	34.02	32.85	31.69	30.52	29.36	39.85	0.1166	$\pm 0.07$
Diethyl chlorofumarate <sup>b</sup>	33.76	33.20	32.09	30.98	29.87	28.77				35.42	0.1109	$\pm 0.02$
Dipentyl chlorofumarate <sup>b</sup>			29.00	28.20	27.39	26.59	25.78	24.98	24.17	31.42	0.0805	$\pm 0.02$
Methyl cis-cinnamate <sup>a</sup>		40.17	38.92	37.66	36.41	35.16	33.90	32.65		42.68	0.1254	$\pm 0.02$
Methyl $\alpha$ -bromocinnamate <sup>a</sup>		45.63	44.36	43.09	41.82	40.56	39.29	38.02	36.75	48.17	0.1269	$\pm 0.06$
Methyl $\beta$ -bromocinnamate <sup>a</sup>		44.36	43.17	41.98	40.79	39.61	38.42	37.23		46.74	0.1189	$\pm 0.40$
Methyl $\alpha$ -bromo-cis-cinnamate <sup>a</sup>		43.48	42.28	41.09	39.89	38.69	37.50	36.52		45.87	0.1196	$\pm 0.07$
Methyl $\beta$ -bromo-cis-cinnamate <sup>a</sup>						36.62	35.45	34.27	33.10	43.68	0.1176	$\pm 0.09$
Propyl hydrocinnamate <sup>b</sup>	34.87	34.37	33.35	32.34	31.33	30.32	29.31	28.29		36.39	0.1012	$\pm 0.05$
Isopropyl hydrocinnamate <sup>b</sup>	33.57	33.09	32.12	31.15	30.18	29.21	28.24	27.27	26.30	35.03	0.0970	$\pm 0.02$
Dimethyl chloromaleate <sup>b</sup>	38.14	37.54	36.35	35.15	33.95	32.75	31.55	30.36	29.16	39.94	0.1198	$\pm 0.06$
3-Iodopropene <sup>d</sup>	32.38	31.75	30.48	29.22	27.96	26.70	25.44	24.17	22.91	34.27	0.1262	$\pm 0.60$
Isopentyl hydrocinnamate <sup>b</sup>	32.19	31.75	30.88	30.01	29.14	28.26	27.39	26.52	25.64	33.50	0.08728	$\pm 0.03$

<sup>a</sup> Ref. [216] (Maximum Bubble Pressure-A) ( $\pm 0.5$ ).<sup>b</sup> Ref. [255] (Capillary Rise Method-A) ( $\pm 0.3$ ).<sup>c</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).<sup>d</sup> Ref. [192] (Capillary Rise Method-A) ( $\pm 0.7$ ).

TABLE 42.1. Halogenated hydrocarbons

Tetrachlorodifluoroethane [97]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.09$ )						Least squares constants	
30.0°	40.0°	50.0°	60.0°	70.0°	80.0 °C	<i>a</i>	<i>b</i>
22.73	21.60	20.46	19.33	18.20	17.07	26.13	0.1133

Trichlorotrifluoroethane [97]

(Capillary Rise Method-A)

Surface tension ( $\gamma = 19.85 - 0.9345t + 0.1448t^2 - 0.0045t^3 - 0.1448t^4$ )				
0°	10°	20°	30°	40 °C
19.85	18.96	17.75	16.56	15.30

Perfluoropentanes [186]

(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )					Least squares constants	
	5°	10°	15°	20°	25 °C	<i>a</i>	<i>b</i>
Perfluoropentane.....	11.28	10.82	10.35	9.89	9.42	11.75	0.0932
Perfluoro-2-methylbutane.....	11.88	11.41	10.94	10.48	10.01	12.35	0.0937
Perfluorocyclopentane.....	-----	12.04	11.58	11.12	-----	12.97	0.0927

Perfluorohexane [211]

(Capillary Rise Method)

Surface tension ( $\pm 0.13$ )								Least squares constants	
10°	15°	20°	25°	30°	35°	40°	50 °C	<i>a</i>	<i>b</i>
12.84	12.38	11.91	11.44	10.97	10.51	10.04	9.10	13.78	0.0935



TABLE 42.1. Halogenated hydrocarbons—Continued

## Perfluoro-2-methylpentane [211]

(Capillary Rise Method)

Surface tension ( $\pm 0.18$ )								Least squares constants	
10°	15°	20°	25°	30°	35°	40°	50 °C	<i>a</i>	<i>b</i>
12.88	12.50	12.12	11.73	11.35	10.97	10.58	9.81	13.65	0.0767

## Hexadecafluoroheptane [161]

(Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.10$ )					Least squares constants	
15°	20°	25°	30°	35 °C	<i>a</i>	<i>b</i>
13.60	13.19	12.78	12.37	11.96	14.83	0.0820

## Perfluoromethylcyclohexane [78]

(Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.15$ )						Least squares constants	
0°	10°	20°	30°	40°	50 °C	<i>a</i>	<i>b</i>
17.70	16.65	15.70	14.70	13.80	12.90	17.69	0.0973

## Fluorotrinitromethane [267]

(Maximum Bubble Pressure Method-A)

Surface tension ( $\pm 0.1$ )						Least squares constants	
10°	15°	20°	30°	40°	50 °C	<i>a</i>	<i>b</i>
26.37	25.76	25.15	23.93	22.71	21.49	27.59	0.1219

TABLE 42.2. Halogen fluorides [185]

(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 0.6$ )							Least squares constants	
	10°	15°	20°	25°	35°	40°	45 °C	<i>a</i>	<i>b</i>
Iodine pentafluoride.....		32.0	30.5	29.9	28.6	27.9		33.16	0.1318
Bromine pentafluoride.....	24.1	23.6	23.0	22.5	21.4			25.24	0.1098
Bromine trifluoride.....	37.3	36.8	36.3	35.8	34.8	34.3	33.8	38.30	0.0999

Chlorine trifluoride [10]

(Capillary Rise Method-V)

Surface tension (orthobaric) ( $\pm 0.2$ )										Least squares constants	
5°	10°	15°	20°	25°	30°	35°	40°	45°	50 °C	<i>a</i>	<i>b</i>
26.1	25.2	24.4	23.6	22.7	21.9	21.1	20.3	19.4	18.6	26.9	0.1660

TABLE 42.3. Antimony pentafluoride [102]

(Maximum Bubble Pressure Method-A)

Surface tension ( $\pm 0.30$ )											Least squares constants	
5°	10°	15°	20°	30°	40°	60°	80°	100°	120°	140 °C	<i>a</i>	<i>b</i>
48.1	47.1	46.2	45.2	43.3	41.3	37.5	33.6	29.7	25.8	22.0	49.07	0.1937

TABLE 42.4. Selenium tetrafluoride [166]

(Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.18$ )										Least squares constants	
5°	10°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>
37.97	37.34	36.07	34.79	33.51	32.24	30.97	29.69	28.42	27.14	38.61	0.1274

TABLE 42.5. Uranium hexafluoride [135]  
 (Capillary Rise Method-V)

Surface tension ( $\pm 0.2$ )				Least squares constants	
70°	80°	90°	100 °C	a	b
16.8	15.6	14.3	13.1	25.5	0.1240

 TABLE 43. Gallium trichloride and addition compounds  
 (Differential Capillary Rise-V)

Compound	Surface tension ( $\pm 0.2$ )										Least squares constants		$\sigma_7$
	70°	80°	90°	100°	110°	120°	130°	140°	150°	160 °C	a	b	
Gallium trichloride <sup>a</sup> .....	28.0	27.0	26.0	25.0	24.0	23.0	22.0	21.0	-----	-----	35.0	0.1000	$\pm 0.3$
Gallium trichloride—pyridine <sup>b</sup> .....	-----	-----	-----	-----	-----	38.7	37.7	36.8	35.7	34.8	50.3	0.0970	$\pm 0.3$
Gallium trichloride—piperidine <sup>c</sup> .....	-----	-----	-----	-----	-----	35.3	34.5	33.6	32.8	32.3	45.5	0.0847	$\pm 0.5$
Gallium trichloride—dipiperidine <sup>c</sup> .....	-----	-----	-----	-----	-----	-----	24.3	22.6	21.0	19.3	46.0	0.1670	$\pm 0.2$
Gallium trichloride—phosphonyl chloride <sup>d</sup> .....	-----	-----	-----	-----	32.7	32.0	31.2	30.5	29.7	-----	41.1	0.0760	$\pm 0.1$

<sup>a</sup> Ref. [75].<sup>c</sup> Ref. [74].<sup>b</sup> Ref. [76].<sup>d</sup> Ref. [73].
 TABLE 44.1. Diteritary glycols [120]  
 (Max. Bubble Pressure-A)

Glycol	Surface tension ( $\pm 0.15$ )					Least squares constants	
	60°	65°	70°	75°	80 °C	a	b
3,6-Diethyl-3,6-octanediol.....	-----	-----	27.13	26.68	26.23	33.43	0.0900
3,11-Diethyl-3,11-tridecanediol.....	-----	29.63	29.27	28.91	28.55	34.31	0.0720
2,11-Dimethyl-2,11-dodecanediol.....	-----	29.79	29.39	28.99	28.59	34.99	0.0800
3,12-Diethyl-3,12-tetradecanediol.....	-----	30.04	29.64	29.23	28.83	35.31	0.0810
4,13-Dipropyl-4,13-hexadecanediol.....	28.32	27.97	27.62	27.09	26.92	32.51	0.06987

TABLE 44.2. Polyethylene glycols and derivatives [68]  
(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 0.14$ )							Least squares constants	
	20°	40°	60°	80°	100°	120°	140 °C	<i>a</i>	<i>b</i>
Ethylene glycol.....	48.43	46.65	44.87	43.09	41.31	39.53	37.75	56.21	0.0890
Diethylene glycol.....	45.21	43.45	41.69	39.93	38.17	36.41	34.65	46.97	0.0880
Triethylene glycol.....	45.57	43.81	42.05	40.29	38.53	36.77	35.01	47.33	0.0880
Heptaethylene glycol.....	48.39	46.61	44.83	43.05	41.27	39.49	37.71	50.17	0.0890
1,3-Propanediol.....	45.62	43.82	42.01	40.21	38.40	36.59	34.79	47.43	0.0903
2-(2-Chloroethoxy)ethyl-2-(2-hydroxyethoxy)ethyl ether.....	43.62	41.77	39.92	38.07	36.22	34.37	32.52	45.47	0.0925
Bis(2-chloroethyl) ether.....	37.96	35.35	32.73	30.12	27.51	-----	-----	40.57	0.1306
<i>p</i> -Dioxane.....	33.45	30.67	27.88	25.10	22.32	-----	-----	36.23	0.1391
Bis(2-methoxyethyl) ether.....	30.14	27.81	25.49	23.16	20.83	-----	-----	32.47	0.1164

TABLE 44.3. Epichlorohydrin [220]  
(Maximum Bubble Pressure-A)

Surface tension ( $\pm 0.30$ )							Least squares constants		$\sigma_1$
10°	20°	30°	40°	60°	80°	100 °C	<i>a</i>	<i>b</i>	
38.40	36.04	35.68	34.32	31.60	28.88	26.16	39.76	0.1360	$\pm 0.06$

TABLE 45. Synthetic glycerides

Ester of glycerol	Surface tension										Least squares constants		$\sigma_T$
	20°	40°	60°	80°	100°	110°	120°	130°	140°	150 °C	<i>a</i>	<i>b</i>	
Glycerol triformate <sup>a</sup> .....	47.41	45.27	43.12	40.98	38.84	37.77	36.70	35.63	34.56	33.48	49.55	0.1071	±0.13
Glycerol acetate <sup>d</sup> .....	41.78	40.04	38.28	36.52	34.77	33.90	-----	-----	-----	-----	43.53	0.08757	±0.05
Glycerol triacetate <sup>a</sup> .....	36.26	34.64	33.02	31.40	29.78	28.97	28.16	27.35	26.54	25.73	37.88	0.081	±0.38
Glycerol tributyrate <sup>a</sup> .....	30.85	29.49	28.14	26.78	25.42	24.74	24.06	23.38	22.70	22.02	32.21	0.0679	±0.14
Glycerol tribexanoate <sup>a</sup> .....	29.93	28.79	27.64	26.50	25.36	24.79	24.22	23.65	23.08	22.50	31.07	0.0571	±0.05
Glycerol trioctanoate <sup>a</sup> .....	29.21	28.17	27.13	26.08	25.04	24.52	24.00	23.48	22.96	22.44	30.25	0.05208	±0.02
Glycerol tridecanoate <sup>a</sup> .....	-----	27.64	26.54	25.45	24.36	23.81	23.27	22.72	22.18	21.63	29.82	0.0546	±0.18
Glycerol trilaurate <sup>a</sup> .....	-----	-----	29.36	28.26	27.17	26.62	26.08	25.53	24.98	24.44	32.64	0.05469	±0.06
Glycerol 1-palmitate <sup>c</sup> .....	-----	-----	-----	22.12	20.78	20.11	19.45	18.78	18.11	-----	27.46	0.06678	±0.15
Glycerol tripalmitate <sup>b</sup> .....	-----	-----	-----	26.88	25.54	24.87	24.20	23.52	-----	-----	32.26	0.0672	±0.03
Glycerol 1-stearate <sup>c</sup> .....	-----	-----	-----	18.64	18.06	17.47	16.88	16.29	-----	-----	24.52	0.05876	±0.15
Glycerol tristearate <sup>b</sup> .....	-----	-----	28.62	27.25	25.88	25.19	24.51	23.82	-----	-----	32.73	0.06854	±0.05
Glycerol trioleate <sup>a</sup> .....	34.63	33.23	31.84	30.44	29.04	28.34	27.64	26.94	26.24	25.54	36.03	0.0699	±0.15
Glycerol trielaidate <sup>c</sup> .....	-----	-----	22.98	21.58	20.18	19.50	18.80	18.10	-----	-----	27.18	0.06986	±0.15
Glycerol trilinoleate <sup>c</sup> .....	20.28	19.70	19.15	18.56	17.99	17.70	17.41	17.12	-----	-----	20.85	0.02867	±0.15
Glycerol 1,2-diacetate 3-oleate <sup>c</sup> .....	21.88	20.82	19.75	18.69	17.62	17.09	16.55	16.02	-----	-----	22.95	0.0533	±0.15
Glycerol 1,2-diacetate 3-stearate <sup>c</sup> .....	-----	-----	26.40	24.53	22.66	21.73	20.79	19.86	-----	-----	32.00	0.09338	±0.15
Glycerol 1,3-di- palmitate <sup>c</sup> .....	-----	-----	-----	22.15	21.23	20.76	20.30	19.84	19.37	-----	25.85	0.04625	±0.15
Glycerol 1,3-dioleate 2-palmitate <sup>c</sup> .....	26.49	25.60	24.72	23.83	22.94	22.49	22.05	21.61	21.16	-----	27.38	0.04442	±0.15
Glycerol trionanoate <sup>c</sup> .....	24.25	23.12	21.99	20.86	19.73	19.16	18.70	18.03	17.47	-----	25.38	0.0565	±0.15

<sup>a</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) (±2.0).<sup>b</sup> Ref. [254] (Capillary Rise Method-A) (±0.30).<sup>c</sup> Ref. [11] (Capillary Pressure-A) (±0.15).<sup>d</sup> Ref. [255] (Capillary Rise Method-A) (±0.20).

TABLE 46. Glycerol trinitrate [222]

(Capillary Rise-A)

Surface tension (±0.2)						Least squares constants	
10°	15°	20°	25°	30°	35 °C	<i>a</i>	<i>b</i>
53.24	51.98	50.73	49.48	48.23	46.98	55.74	0.2504

TABLE 47. Halogen compounds of benzene and homologs

Compound	Surface tension											Least squares constants		$\sigma_T$					
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°		140°	150°	160 °C	a	b
Fluorobenzene <sup>a</sup>	28.47	27.26	26.06	24.85	23.65	22.45	21.24	20.04	18.84	17.64	16.44	15.24	14.04	12.84	11.64	10.44	29.67	0.1204	±0.03
Chlorobenzene <sup>c</sup>	34.78	33.59	32.40	31.21	30.01	28.82	27.63	26.44	25.25	24.06	22.87	21.68	20.49	19.30	18.11	16.92	35.97	0.1191	±0.20
Bromobenzene <sup>c</sup>	36.98	35.82	34.66	33.50	32.34	31.18	30.02	28.86	27.70	26.54	25.38	24.22	23.06	21.90	20.74	19.58	38.14	0.1160	±0.05
Iodobenzene <sup>a</sup>	40.40	39.27	38.15	37.03	35.90	34.78	33.66	32.54	31.41	30.29	29.17	28.04	26.92	25.80	24.67	23.55	41.52	0.1123	±0.17
<i>p</i> -Fluorotoluene <sup>a</sup>	29.33	28.22	27.11	26.00	24.89	23.75	22.68	21.57	20.46	19.35	18.24	17.13	16.02	14.91	13.80	12.69	30.44	0.1109	±0.07
<i>m</i> -Fluorotoluene <sup>b</sup>	31.05	29.80	28.54	27.28	26.02	24.77	23.51	22.25	21.00	19.74	18.48	17.22	15.96	14.70	13.44	12.18	32.31	0.1257	±0.10
<i>p</i> -Chlorotoluene <sup>a</sup>	33.85	32.77	31.68	30.60	29.52	28.44	27.36	26.27	25.19	24.11	23.03	21.95	20.86	19.78	18.70	17.62	34.93	0.1082	±0.10
<i>o</i> -Bromotoluene <sup>b</sup>	35.63	34.63	33.63	32.63	31.63	30.63	29.63	28.64	27.64	26.64	25.64	24.65	23.65	22.65	21.65	20.65	36.62	0.09979	±0.15
<i>p</i> -Bromotoluene <sup>c</sup>	33.41	32.41	31.41	30.42	29.42	28.42	27.43	26.43	25.43	24.44	23.44	22.44	21.44	20.45	19.45	18.45	36.40	0.0997	±0.14
<i>p</i> -Iodotoluene <sup>c</sup>	37.15	36.01	34.86	33.71	32.56	31.42	30.27	29.12	27.98	26.83	25.68	24.54	23.39	22.24	21.09	19.95	38.30	0.09654	±0.18
<i>m</i> -Dichlorobenzene <sup>a</sup>	37.15	36.01	34.86	33.71	32.56	31.42	30.27	29.12	27.98	26.83	25.68	24.54	23.39	22.24	21.09	19.95	38.30	0.1147	±0.10
<i>p</i> -Dichlorobenzene <sup>b</sup>	37.15	36.01	34.86	33.71	32.56	31.42	30.27	29.12	27.98	26.83	25.68	24.54	23.39	22.24	21.09	19.95	38.30	0.0879	±0.05
<i>p</i> -Dibromobenzene <sup>b</sup>	37.15	36.01	34.86	33.71	32.56	31.42	30.27	29.12	27.98	26.83	25.68	24.54	23.39	22.24	21.09	19.95	38.30	0.0879	±0.05
1-Bromo-4-fluoro- benzene <sup>b</sup>	35.71	34.68	33.64	32.61	31.57	30.53	29.50	28.46	27.43	26.39	25.35	24.32	23.28	22.25	21.21	20.17	36.75	0.1036	±0.13
1-Bromo-4-chloro- benzene <sup>d</sup>	35.71	34.68	33.64	32.61	31.57	30.53	29.50	28.46	27.43	26.39	25.35	24.32	23.28	22.25	21.21	20.17	36.75	0.1036	±0.13
1-Chloro-4-iodo- benzene <sup>e</sup>	35.71	34.68	33.64	32.61	31.57	30.53	29.50	28.46	27.43	26.39	25.35	24.32	23.28	22.25	21.21	20.17	36.75	0.1036	±0.13
$\alpha,\alpha'$ -Dichloro- toluene <sup>d</sup>	40.22	39.19	38.15	37.12	36.08	35.05	34.01	32.98	31.94	30.91	29.87	28.84	27.80	26.77	25.73	24.70	41.26	0.1035	±0.80
$\alpha$ -Chlorotoluene <sup>d</sup>	38.69	37.47	36.24	35.01	33.78	32.56	31.33	30.10	28.88	27.65	26.42	25.20	23.97	22.74	21.51	20.29	39.92	0.1227	±0.09
$\alpha$ -Bromotoluene <sup>a</sup>	33.66	32.33	30.99	29.66	28.33	27.00	25.67	24.33	23.00	21.67	20.34	19.01	17.67	16.34	15.01	13.68	34.99	0.1332	-----
Benzoyl chloride <sup>d</sup>	40.26	39.17	38.09	37.00	35.92	34.84	33.75	32.67	31.58	30.50	29.42	28.33	27.25	26.16	25.08	24.00	41.34	0.1084	±0.80
Benzoyl bromide <sup>c</sup>	44.45	43.06	41.66	40.26	38.86	37.47	36.07	34.67	33.28	31.88	30.48	29.09	27.69	26.29	24.89	23.50	45.85	0.1397	-----
<i>o</i> -Chloroaniline <sup>b</sup>	41.59	40.73	39.86	38.99	38.13	37.26	36.39	35.53	34.66	33.79	32.93	32.06	31.19	30.33	29.46	28.59	42.46	0.08667	±0.50
<i>p</i> -Chloroaniline <sup>c</sup>	41.59	40.73	39.86	38.99	38.13	37.26	36.39	35.53	34.66	33.79	32.93	32.06	31.19	30.33	29.46	28.59	42.46	0.08667	±0.50
(2-Bromoethyl)- benzene <sup>a</sup>	40.02	38.92	37.82	36.72	35.62	34.52	33.42	32.32	31.22	30.12	29.02	27.92	26.82	25.72	24.62	23.52	41.12	0.1100	±0.06
(2-Iodoethyl)- benzene <sup>a</sup>	41.77	40.71	39.64	38.57	37.50	36.44	35.37	34.30	33.24	32.17	31.10	30.04	28.97	27.90	26.83	25.77	42.84	0.1067	±0.17
Benzenesulfonyl fluoride <sup>a</sup>	37.64	36.56	35.48	34.39	33.31	32.23	31.15	30.06	28.98	27.90	26.81	25.73	24.65	23.57	22.49	21.41	39.81	0.1083	±0.08
Benzenesulfonyl chloride <sup>a</sup>	43.25	42.13	41.01	39.89	38.78	37.66	36.54	35.43	34.31	33.19	32.08	30.96	29.84	28.72	27.60	26.48	45.48	0.1117	±0.06
<i>p</i> -Toluenesulfonyl chloride <sup>c</sup>	37.11	35.94	34.78	33.61	32.45	31.29	30.13	28.97	27.81	26.65	25.49	24.33	23.17	22.01	20.85	19.69	39.44	0.0903	±0.03
(Bromomethyl)etra- hydrofuran <sup>a</sup>	38.27	37.11	35.94	34.78	33.61	32.45	31.29	30.13	28.97	27.81	26.65	25.49	24.33	23.17	22.01	20.85	39.44	0.1165	±0.03

<sup>a</sup> Ref. [244] (Capillary Rise-A) (±0.10).<sup>b</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) (±2.0).<sup>c</sup> Ref. [215] (Maximum Bubble Pressure-A) (±1.0).<sup>d</sup> Ref. [45] (Capillary Rise-A) (±1.0).<sup>e</sup> Ref. [115] (Capillary Rise-A) (±0.90).<sup>f</sup> Ref. [26] (Maximum Bubble Pressure-A) (±0.2).

TABLE 48.1. Fluoroacetic acid [111]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.05$ )							Least squares constants	
36°	40°	50°	60°	70°	80°	95 °C	<i>a</i>	<i>b</i>
38.21	37.76	36.65	35.54	34.43	33.32	31.64	42.22	0.11145

TABLE 48.2. Trifluoroacetic acid [113]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.05$ )												Least squares constants	
24°	26°	28°	30°	35°	40°	45°	50°	55°	60°	65°	68 °C	<i>a</i>	<i>b</i>
13.63	13.44	13.28	13.11	12.68	12.25	11.83	11.42	10.99	10.57	10.15	9.90	15.64	0.08444

TABLE 48.3. Bromoacetic acid [109]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.06$ )							Least squares constants	
55°	70°	85°	100°	120°	145°	170 °C	<i>a</i>	<i>b</i>
40.30	38.57	36.96	35.13	33.14	30.40	27.72	46.21	6.1090

TABLE 48.4. Iodoacetic acid [109]  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.06$ )							Least squares constants	
85°	90°	95°	100°	110°	120°	130 °C	<i>a</i>	<i>b</i>
38.63	38.03	37.35	36.85	35.87	34.54	34.41	42.36	0.1148

TABLE 48.5. Chloroacetic acid [121]  
(Capillary Rise Method-A)

Surface tension ( $\pm 0.1$ )									Least squares constants	
40°	45°	50°	55°	60°	65°	70°	75°	80 °C	<i>a</i>	<i>b</i>
38.80	38.24	37.68	37.13	36.57	36.02	35.45	34.89	34.33	43.27	0.1117

TABLE 48.6. Dichloroacetic acid [108]  
(Maximum Bubble Pressure Method-N<sub>2</sub>)

Surface tension ( $\pm 2.0$ )									Least squares constants	
20°	30°	40°	50°	60°	70°	80°	90°	100 °C	<i>a</i>	<i>b</i>
35.9	35.0	34.1	33.1	32.2	31.3	30.4	29.4	28.5	37.8	0.09272

TABLE 48.7. Trichloroacetic acid [108]  
(Maximum Bubble Pressure Method-N<sub>2</sub>)

Surface tension ( $\pm 2.0$ )								Least squares constants	
80°	90°	100°	120°	140°	160°	180° <sub>3</sub>	200 °C	<i>a</i>	<i>b</i>
28.2	27.3	26.4	24.7	22.9	21.1	19.3	17.5	35.4	0.0895



TABLE 49. Hexyl alcohols  
(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 0.1$ )											Least squares constants		$\sigma_T$
	15°	25°	35°	45°	55°	65°	75°	85°	95°	105°	115°	a	b	
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C				
2-Methyl-1-pentanol <sup>b</sup>	25.75	24.93	24.11	23.29	22.48	21.66	20.84	20.02	19.20	18.38	17.56	26.98	0.0819	$\pm 0.07$
2-Methyl-2-pentanol <sup>a</sup>	23.78	22.92	22.06	21.20	20.24	19.48	18.62	17.75	16.89	16.02	15.17	25.07	0.08606	$\pm 0.08$
2-Methyl-3-pentanol <sup>d</sup>	25.06	24.14	23.23	22.32	21.40	20.49	19.57	18.66	17.75	16.83	15.92	26.43	0.0914	$\pm 0.14$
4-Methyl-2-pentanol <sup>b</sup>	23.44	22.62	21.80	20.98	20.15	19.33	18.51	17.69	16.87	16.05	15.23	24.67	0.0821	$\pm 0.04$
4-Methyl-1-pentanol <sup>e</sup>	24.81	24.07	23.32	22.58	21.84	21.10	20.35	19.61	18.87	18.12	17.38	25.93	0.07434	$\pm 0.14$
3-Methyl-1-pentanol <sup>e</sup>	25.74	24.95	24.16	23.37	22.58	21.79	21.00	20.21	19.42	18.63	17.84	26.92	0.07894	$\pm 0.20$
3-Methyl-2-pentanol <sup>e</sup>	25.76	24.84	23.92	23.00	22.09	21.17	20.25	19.33	18.41	17.49	16.57	27.14	0.0919	$\pm 0.13$
3-Methyl-3-pentanol <sup>d</sup>	24.15	23.26	22.37	21.48	20.60	19.71	18.82	17.93	17.04	16.16	15.27	25.48	0.0888	$\pm 0.24$
2,3-Dimethyl-2-butanol <sup>e</sup>	24.73	23.74	22.75	21.76	20.76	19.77	18.78	17.79	16.80	15.80	14.81	26.22	0.0992	$\pm 0.15$
Hexyl alcohol <sup>b</sup>	26.61	25.81	25.01	24.21	23.40	22.60	21.80	21.00	20.20	19.40	18.60	27.81	0.0801	$\pm 0.07$
2-Hexanol <sup>b</sup>	25.14	24.27	23.40	22.53	21.66	20.79	19.92	19.05	18.18	17.32	16.45	26.44	0.0869	$\pm 0.07$
3-Hexanol <sup>b</sup>	24.95	24.07	23.19	22.31	21.43	20.55	19.67	18.79	17.91	17.03	16.15	26.27	0.0880	$\pm 0.06$

<sup>a</sup> Ref. [96].<sup>b</sup> Ref. [98].<sup>c</sup> Ref. [101].<sup>d</sup> Ref. [99].<sup>e</sup> Ref. [100].

TABLE 50. Hydrazines [251]  
 (Maximum Bubble Pressure-A)

Hydrazine	Surface tension ( $\pm 0.15$ )							Least squares constants		$\sigma_{\gamma}$
	15°	20°	25°	30°	40°	50°	60 °C	<i>a</i>	<i>b</i>	
Hydrazine <sup>a</sup> .....	68.80	67.60	66.39	65.19	62.78	-----	-----	72.41	0.2407	$\pm 0.02$
1,1-Diethyl.....	25.39	24.87	24.35	23.83	22.79	21.75	20.71	26.95	0.1040	$\pm 0.02$
1,1-Dipropyl.....	-----	25.16	24.65	24.15	23.14	22.13	21.13	27.17	0.1007	$\pm 0.06$
1,1-Dibutyl.....	-----	26.17	25.71	25.25	24.34	-----	-----	27.99	0.0912	$\pm 0.00$
1,1-Dipentyl.....	27.43	26.95	26.48	26.01	25.06	24.11	23.16	28.85	0.0948	$\pm 0.03$

<sup>a</sup> Ref. [12] ( $\pm 0.15$ ).

TABLE 51.1. Olefins I [1]

Compound	Surface tension							Least squares constants	
	-30°	-20°	-10°	10°	20°	25°	30 °C	<i>a</i>	<i>b</i>
1-Pentene.....	21.50	20.40	19.30	17.10	16.00	15.45	-----	18.20	0.1099
<i>cis</i> -2-Pentene.....	-----	-----	-----	18.56	17.39	16.80	16.21	19.73	0.1172
<i>trans</i> -2-Pentene.....	-----	-----	-----	17.90	16.91	16.41	15.91	18.90	0.09972
2-Methyl-1-butene.....	-----	-----	-----	17.66	16.51	15.94	15.37	18.81	0.1148
3-Methyl-1-butene.....	-----	-----	-----	15.39	14.36	13.84	-----	16.42	0.1031

 TABLE 51.2. Olefins II [112]  
 (Capillary Rise Method-N<sub>2</sub>)

Compound	Surface tension ( $\pm 0.10$ )											Least squares constants	
	10°	20°	25°	30°	40°	50°	60°	70°	80°	90°	100 °C	<i>a</i>	<i>b</i>
1-Hexene.....	19.44	18.42	17.90	17.39	16.36	15.33	14.31	-----	-----	-----	-----	20.47	0.1027
1-Heptene.....	21.29	20.30	19.80	19.31	18.32	17.33	16.34	15.34	14.35	-----	-----	22.28	0.0990
1-Octene.....	22.72	21.76	21.28	20.81	19.85	18.89	17.93	16.97	16.02	15.06	14.10	23.68	0.0958
1-Nonene.....	23.96	23.02	22.56	22.09	21.15	20.21	19.27	18.33	17.40	16.46	15.52	24.90	0.0937
1-Decene.....	24.92	24.00	23.54	23.08	22.16	21.24	20.33	19.41	18.49	17.57	16.65	25.84	0.0919
1-Undecene.....	25.77	24.86	24.41	23.96	23.05	22.15	21.24	20.34	19.43	18.53	17.62	26.67	0.0904
1-Dodecene.....	26.49	25.60	25.15	24.71	23.82	22.92	22.03	21.14	20.25	19.36	18.47	27.38	0.0891
1-Tridecene <sup>a</sup> .....	27.13	26.24	25.80	25.36	24.48	23.59	22.71	21.82	20.94	20.06	19.17	28.01	0.0883
1-Tetradecene.....	27.68	26.80	26.36	25.92	25.04	24.16	23.29	22.41	21.53	20.65	19.77	28.56	0.0879
1-Pentadecene <sup>a</sup> .....	28.17	27.31	26.87	26.44	25.57	24.70	23.84	22.97	22.11	21.24	20.37	29.04	0.0866
1-Hexadecene.....	28.61	27.75	27.32	26.89	26.03	25.16	24.30	23.44	22.58	21.72	20.86	29.47	0.0861
1-Heptadecene <sup>a</sup> .....	-----	28.14	27.71	27.29	26.43	25.58	24.72	23.87	23.01	22.16	21.30	29.85	0.0854
1-Octadecene <sup>a</sup> .....	-----	28.49	28.06	27.63	26.78	25.93	25.08	24.23	23.37	22.52	21.67	30.19	0.0852
1-Nonadecene <sup>a</sup> .....	-----	-----	28.39	27.97	27.13	26.28	25.44	24.60	23.76	22.92	22.08	30.49	0.0841
1-Eicosene <sup>a</sup> .....	-----	-----	28.69	28.27	27.43	26.58	25.74	24.90	24.06	23.22	22.38	30.79	0.0841

<sup>a</sup> Ref. [1].

TABLE 51.3. Paraffins

Compound	Surface tension											Least squares constants			
	-20°	-10°	10°	20°	25°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b
2-Methylbutane <sup>a</sup>	19.41	18.30	16.10	14.99	14.44	16.37	15.36	14.39	13.39					17.20	0.1103
2-Methylpentane <sup>b</sup>			18.37	17.38	16.87	17.08	16.02	14.96	13.90					19.37	0.09967
3-Methylpentane <sup>c</sup>			19.20	18.14	17.61	17.81	16.75	15.69	14.63					20.26	0.1060
3-Ethylpentane <sup>d</sup>			24.78	23.55	21.49	20.46	19.94	18.39	17.36	15.30	14.26			22.52	0.1032
2-Methylhexane <sup>b</sup>			23.15	22.18	20.26	19.29	18.81	18.33	17.37	16.40	15.44	12.45		21.22	0.09635
3-Methylhexane <sup>b</sup>			23.67	22.70	20.76	19.79	19.31	18.82	17.85	16.88	15.91	13.00		21.73	0.09699
3-Ethylhexane <sup>e</sup>					22.60	21.62	21.13	20.64	19.66	18.68	17.70	14.76	13.78	23.58	0.0980
2-Methylheptane <sup>c</sup>			21.72	20.75	20.27	19.79	18.82	17.86	16.90	15.93	14.97	14.00	13.04	22.68	0.0964
3-Methylheptane <sup>e</sup>			22.28	21.31	20.82	20.34	19.37	18.40	17.43	16.46	15.49	14.52	13.55	23.25	0.0970
4-Methylheptane <sup>e</sup>			22.11	21.12	20.63	20.14	19.15	18.17	17.19	16.20	15.22	14.23	13.25	23.09	0.0984
3-Ethylheptane <sup>b</sup>			23.76	22.83	22.36	21.89	20.95	20.01	19.08					24.70	0.0937
4-Ethylheptane <sup>b</sup>			23.76	22.83	22.36	21.89	20.95	20.01	19.08					24.70	0.0937
2-Methyloctane <sup>b</sup>			22.82	21.88	21.41	20.94	20.00	19.06	18.12					23.76	0.0940
3-Methyloctane <sup>b</sup>			23.28	22.34	21.87	21.40	20.46	19.52	18.58					24.22	0.0940
4-Methyloctane <sup>b</sup>			23.28	22.34	21.87	21.40	20.46	19.52	18.58					24.22	0.0940
2,2-Dimethylbutane <sup>b</sup>			17.30	16.31	15.81	15.32	14.33							18.29	0.0990
2,3-Dimethylbutane <sup>b</sup>			18.38	17.38	16.88	16.38	15.38	14.38						19.38	0.09998
2,2-Dimethylpentane <sup>d</sup>	21.85	20.90	18.98	18.03	17.55	17.07	16.11	15.16	14.20	13.24	12.29			19.94	0.09565
2,3-Dimethylpentane <sup>d</sup>	23.95	22.95	20.97	19.97	19.47	18.98	17.98	16.99	15.99	15.00	13.99			21.96	0.09945
2,4-Dimethylpentane <sup>d</sup>	22.03	21.06	19.12	18.15	17.66	17.18	16.20	15.23	14.26	13.29	12.32			20.09	0.09715
3,3-Dimethylpentane <sup>d</sup>	23.58	22.59	20.59	19.60	19.10	18.60	17.61	16.61	15.62	14.62	13.63			21.59	0.09955
2,2-Dimethylhexane <sup>b</sup>			20.50	19.61	19.17	18.73	17.84	16.96	16.08	15.19	14.31	13.42	12.54	21.38	0.0884
2,3-Dimethylhexane <sup>b</sup>			21.91	21.00	20.54	20.09	19.18	18.26	17.35	16.44	15.53	14.62	13.71	22.82	0.0911
2,4-Dimethylhexane <sup>b</sup>			20.96	20.05	19.59	19.14	18.23	17.33	16.42	15.51	14.61	13.70	12.79	21.86	0.09069
2,5-Dimethylhexane <sup>e</sup>			20.77	19.86	19.40	18.94	18.03	17.12	16.21	15.30	14.38	13.47	12.56	21.68	0.09121
3,3-Dimethylhexane <sup>b</sup>			21.62	20.70	20.25	19.79	18.88	17.96	17.05	16.14	15.23	14.31	13.40	22.53	0.09134
3,4-Dimethylhexane <sup>e</sup>			22.67	21.72	21.24	20.76	19.81	18.86	17.91	16.96	16.00	15.05	14.10	23.62	0.09521
3,4-Diethylhexane <sup>e</sup>			24.39	23.51	23.06	22.62	21.74	20.86	19.98	19.10	18.21	17.33		25.27	0.08820
2,2-Dimethylheptane <sup>e</sup>			21.82	20.89	20.42	19.96	19.03	18.10	17.17					22.75	0.0930
2,3-Dimethylheptane <sup>e</sup>			23.35	22.40	21.93	21.46	20.51	19.56	18.61					24.30	0.09477

TABLE 51.3. Paraffins—Continued

Compound	Surface tension										Least squares constants		
	10°	20°	25°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b
2,4-Dimethylheptane <sup>b</sup>	22.28	21.35	20.89	20.42	19.49	18.56	17.64					23.21	0.09290
2,5-Dimethylheptane <sup>b</sup>	22.28	21.35	20.89	20.42	19.49	18.56	17.64					23.21	0.09290
2,6-Dimethylheptane <sup>c</sup>	21.88	21.00	20.55	20.11	19.22	18.34	17.45	16.55	15.68	14.79	13.90	22.77	0.08868
3,3-Dimethylheptane <sup>b</sup>	22.99	22.06	21.60	21.13	20.20	19.27	18.35					23.92	0.0929
3,4-Dimethylheptane <sup>b</sup>	23.78	22.85	22.38	21.91	20.97	20.04	19.10					24.72	0.09367
3,5-Dimethylheptane <sup>b</sup>	22.77	21.84	21.37	20.90	19.97	19.03	18.09					23.71	0.09361
4,4-Dimethylheptane <sup>b</sup>	22.99	22.06	21.60	21.13	20.20	19.27	18.35					23.92	0.09291
3-Ethyl-2-methylpentane <sup>b</sup>	22.45	21.52	21.06	20.59	19.66	18.73	17.80	16.87	15.94	15.01	14.08	23.38	0.0930
3-Ethyl-3-methylpentane <sup>b</sup>	22.91	21.99	21.54	21.08	20.16	19.24	18.33	17.41	16.49	15.57	14.65	23.83	0.09179
2,2,3-Trimethylpentane <sup>b</sup>	21.57	20.67	20.22	19.77	18.88	17.99	17.09	16.20	15.30	14.40	13.51	22.46	0.08950
2,2,4-Trimethylpentane <sup>b</sup>	19.67	18.77	18.33	17.89	17.00	16.11	15.23	14.34	13.45	12.56	11.68	20.55	0.08876
2,3,3-Trimethylpentane <sup>b</sup>	22.48	21.57	21.12	20.66	19.76	18.85	17.94	17.03	16.13	15.21	14.30	23.39	0.09086
2,3,4-Trimethylpentane <sup>b</sup>	22.07	21.16	20.70	20.24	19.32	18.41	17.49	16.53	15.66	14.74	13.83	22.99	0.09165
2,2,3-Trimethylbutane <sup>d</sup>	19.73	18.75	18.27	17.78	16.81	15.84	14.86	13.89	12.92	11.95		20.70	0.09726
3-Ethyl-2-methylhexane <sup>b</sup>	23.73	22.80	22.34	21.87	20.94	20.01	19.08					20.66	0.0930
4-Ethyl-2-methylhexane	22.75	21.80	21.32	20.85	19.90	18.95	18.00					23.70	0.0946
3-Ethyl-3-methylhexane	24.19	23.25	22.77	22.30	21.36	20.41	19.47					25.14	0.0946
4-Ethyl-3-methylhexane	24.21	23.27	22.80	22.34	21.40	20.47	19.53					25.14	0.09344
2,2,3-Trimethylhexane	22.77	21.87	21.42	20.97	20.07	19.17	18.27					23.67	0.09005
2,2,4-Trimethylhexane	21.35	20.51	20.09	19.67	18.83	18.00	17.16					22.19	0.08388
2,2,5-Trimethylhexane	20.91	20.03	19.59	19.16	18.28	17.40	16.52					21.79	0.08788
2,3,3-Trimethylhexane	23.31	22.40	21.95	21.50	20.59	19.69	18.78					24.21	0.09048
2,3,4-Trimethylhexane	23.73	22.80	22.33	21.87	20.94	20.01	19.08					24.66	0.09308
2,3,5-Trimethylhexane	22.15	21.27	20.82	20.38	19.50	18.61	17.72					23.04	0.08860
2,4,4-Trimethylhexane	22.00	21.17	20.75	20.33	19.49	18.66	17.82					22.84	0.08363
3,3,4-Trimethylhexane	24.23	23.27	22.79	22.31	21.35	20.39	19.44					25.19	0.09591
3,3-Diethylpentane	24.76	23.75	23.29	22.83	21.91	21.00	20.08					25.38	0.09165
3-Ethyl-2,2-dimethylpentane	23.34	22.39	21.92	21.45	20.51	19.56	18.62					24.28	0.0944
3-Ethyl-2,3-dimethylpentane	24.81	23.87	23.40	22.94	22.00	21.07	20.14					25.74	0.09343
3-Ethyl-2,4-dimethylpentane	23.76	22.81	22.34	21.87	20.93	19.98	19.04					24.70	0.0944

TABLE 51.3. Paraffins—Continued

Compound	Surface tension											Least squares constants	
	10°	20°	25°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b
2,2,3,3-Tetramethylpentane <sup>d</sup>	24.28	23.38	22.94	22.49	21.60	20.70	19.81					25.17	0.08933
2,2,3,4-Tetramethylpentane <sup>d</sup>	22.85	21.98	21.55	21.12	20.25	19.39	18.53					23.71	0.08638
2,2,3,4-Tetramethylpentane <sup>d</sup>	21.28	20.37	19.92	19.46	18.55	17.64	16.74					22.19	0.09091
2,3,3,4-Tetramethylpentane <sup>d</sup>	24.18	23.31	22.88	22.44	21.58	20.72	19.85					25.04	0.08645
2,7,7-Dimethyloctane <sup>e</sup>	23.39	22.49	22.04	21.60	20.70	19.81	18.92	18.02	17.13	16.23	15.34	24.23	0.08941
4,5-Dimethyloctane <sup>e</sup>	24.29	23.41	22.98	22.54 <sup>h</sup>	21.67	20.79	19.92	19.05	18.18	17.30	16.43	25.15	0.0873
11-Decylidocosane <sup>f</sup>		30.2		29.4	28.6	27.8	27.0	26.2	25.4	24.6		31.8	0.0800

<sup>d</sup> Ref. [182] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).

<sup>e</sup> Ref. [238] (Capillary Rise Method-A) ( $\pm 0.10$ ).

<sup>f</sup> Ref. [124] (Capillary Rise Method-A) ( $\pm 0.20$ ).

<sup>a</sup> Ref. [91] (Capillary Rise Method-A) ( $\pm 0.10$ ).

<sup>b</sup> Ref. [1].

<sup>c</sup> Ref. [174] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).

TABLE 51.4. Normal paraffins [112]  
 (Capillary Rise Method-N<sub>2</sub>)

Compound	Surface tension ( $\pm 0.10$ )												Least squares constants	
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120 °C	$a$	$b$
Pentane.....	17.15	16.05	14.94	-----	-----	-----	-----	-----	-----	-----	-----	-----	18.25	0.11021
Hexane.....	19.42	18.40	17.38	16.36	15.34	14.32	-----	-----	-----	-----	-----	-----	20.44	0.1022
Heptane.....	21.12	20.14	19.17	18.18	17.20	16.22	15.24	14.26	13.28	-----	-----	-----	22.10	0.0980
Octane.....	22.57	21.62	20.67	19.71	18.77	17.81	16.86	15.91	14.96	14.01	13.06	12.11	23.52	0.09509
Nonane.....	23.79	22.85	21.92	20.98	20.05	19.12	18.18	17.24	16.31	15.37	14.44	13.50	24.72	0.09347
Decane.....	24.75	23.83	22.91	21.99	21.07	20.15	19.23	18.31	17.39	16.47	15.55	14.63	25.67	0.09197
Undecane.....	25.56	24.66	23.76	22.86	21.96	21.05	20.15	19.25	18.35	17.45	16.55	15.65	26.46	0.09010
Dodecane.....	26.24	25.35	24.47	23.58	22.70	21.81	20.93	20.05	19.16	18.28	17.39	16.51	27.12	0.08843
Tridecane.....	26.86	25.99	25.11	24.24	23.37	22.50	21.63	20.75	19.88	19.01	18.14	17.27	27.73	0.08719
Tetradecane.....	27.43	26.56	25.69	24.82	23.96	23.09	22.22	21.35	20.48	19.61	18.74	17.87	28.30	0.08688
Pentadecane.....	-----	27.07	26.21	25.35	24.50	23.64	22.78	21.93	21.07	20.21	19.36	18.50	28.78	0.08565
Hexadecane.....	-----	27.47	26.62	25.76	24.91	24.06	23.20	22.35	21.49	20.64	19.79	18.93	29.18	0.08540
Heptadecane.....	-----	-----	27.06	26.22	25.38	24.52	23.68	22.83	21.99	21.14	20.29	19.45	29.60	0.08460
Octadecane.....	-----	-----	27.45	26.61	25.77	24.92	24.08	23.24	22.39	21.55	20.71	19.87	29.98	0.08428
Nonadecane <sup>a</sup> .....	-----	28.59	27.75	26.91	26.07	25.24	24.40	23.56	22.73	21.89	21.05	20.21	30.26	0.08373
Eicosane <sup>a</sup> .....	-----	28.87	28.04	27.21	26.38	25.54	24.71	23.88	23.04	22.21	21.38	20.54	30.54	0.08329

TABLE 51.4. Normal paraffins [112]—Continued

Compound	Surface tension ( $\pm 0.12$ )											Least squares constants		$\sigma_7$
	70°	80°	90°	100°	110°	120°	130°	140°	150°	160°	180 °C	$a$	$b$	
Hexacosane <sup>b</sup> .....	26.33	25.59	24.86	24.13	23.39	22.66	21.93	21.20	20.46	19.73	18.26	31.46	0.07332	$\pm 0.05$
Hexacontane <sup>b</sup> .....	-----	-----	-----	-----	24.48	23.90	23.31	22.73	22.15	21.57	20.40	30.89	0.05827	$\pm 0.02$

<sup>a</sup> Ref. [1].

<sup>b</sup> Ref. [191] (Capillary Rise Method-A).

TABLE 52. Hydrocarbons from diphenylmethane [53]  
(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.2$ )												Least squares constants		$\sigma_7$	Avg. % error
													a	b		
	20°	30°	40°	50°	60°	70°	80°	90°	100°	150°	200°	250 °C				
Ditolylmethane <sup>a</sup> .....	36.42	35.56	34.70	33.84	32.98	32.12	31.25	30.39	29.53	25.23	20.93	16.62	38.14	0.08607	$\pm 0.27$	0.26
Dicumenylmethane.....	33.05	32.28	31.51	30.74	29.97	29.20	28.43	27.66	26.89	23.04	19.20	15.35	34.59	0.07697	$\pm 0.27$	0.35

<sup>a</sup> Mixture of isomers.

TABLE 53. Inorganic sulfur compounds

Compound	Surface tension							Least squares constants		$\sigma_T$
	10°	20°	30°	40°	50°	60°	70 °C	<i>a</i>	<i>b</i>	
Carbon disulfide <sup>a</sup> .....	33.81	32.32	30.84	29.35	27.87	-----	-----	35.29	0.1484	$\pm 0.02$
Thionyl bromide <sup>b</sup> .....	45.53	44.78	44.03	43.28	42.53	41.78	-----	46.28	0.0750	-----

<sup>a</sup> Ref. [177, 261] (Capillary Rise Method-A) ( $\pm 0.3$ ).<sup>b</sup> Ref. [147] (Capillary Rise Method).

TABLE 54. The ionones and derivatives [158]

(Cap. Rise-A)

Compound	Surface tension ( $\pm 0.10$ )							Least squares constants		$\sigma_T$
	10°	20°	30°	40°	50°	60°	70 °C	<i>a</i>	<i>b</i>	
$\alpha$ -Ionone.....	33.15	32.20	31.25	30.30	29.35	28.41	27.46	34.10	0.0949	$\pm 0.01$
$\beta$ -Ionone.....	34.41	33.46	32.51	31.56	30.61	29.66	28.71	35.36	0.09497	$\pm 0.09$
3-Methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)- 3-buten-2-one.....	33.13	32.17	31.20	30.24	29.28	28.32	27.36	34.09	0.0962	$\pm 0.01$
4-(2,2,6-Trimethylcyclohexyl)- 2-butanol.....	31.43	30.57	29.71	28.85	27.99	27.14	26.28	32.29	0.0859	$\pm 0.01$
3-Methyl-4-(2,2,6-trimethylcyclohexyl)- 2-butanol.....	32.11	31.26	30.40	29.55	28.69	27.83	26.98	32.97	0.0856	$\pm 0.04$
4-(2,6,6-Trimethyl-2-cyclohexen-1-yl)- 2-butanol.....	31.72	30.89	30.07	29.24	28.42	27.60	26.77	32.54	0.0824	$\pm 0.01$
4-(2,6,6-Trimethyl-1-cyclohexen-1-yl)- 2-butanol.....	32.55	31.68	30.81	29.94	29.07	28.20	27.33	33.42	0.0870	$\pm 0.01$
3-Methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)- 2-butanol.....	31.41	30.63	29.85	29.07	28.29	27.52	26.74	32.19	0.0779	$\pm 0.01$
4-(2,6,6-Trimethyl-2-cyclohexen-1-yl)- 2-butanol acetate.....	30.52	29.59	28.67	27.75	26.82	25.90	24.98	31.44	0.0923	$\pm 0.01$
4-(2,6,6-Trimethyl-1-cyclohexen-1-yl)- 2-butanol acetate.....	30.55	29.67	28.80	27.92	27.04	26.16	25.28	31.43	0.0878	$\pm 0.01$
3-Methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)- 2-butanol acetate.....	30.39	29.47	28.54	27.62	26.69	25.77	24.84	31.32	0.0925	$\pm 0.01$



TABLE 55. Isomers of chlorododecane [70]

(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.1$ )							Least squares constants	
	20°	30°	40°	50°	60°	70°	80 °C	<i>a</i>	<i>b</i>
1-Chlorododecane.....	29.87	28.82	27.87	27.02	26.05	25.17	24.47	31.56	0.0904
2-Chlorododecane.....	28.62	27.70	26.88	25.99	25.03	24.07	23.23	30.45	0.0903
3-Chlorododecane.....	28.58	27.59	26.72	25.78	25.02	24.19	23.22	30.26	0.0878
4-Chlorododecane.....	28.01	27.30	26.37	25.45	24.59	23.81	22.94	29.47	0.0856
5-Chlorododecane.....	28.08	27.20	26.19	25.41	24.57	23.71	22.86	29.76	0.0866
6-Chlorododecane.....	27.94	27.08	26.23	25.25	24.37	23.60	22.75	29.67	0.0871

TABLE 56. Isoxazole and derivatives [208]

(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.15$ )						Least squares constants		$\sigma_\gamma$
	10°	20°	30°	40°	50°	60 °C	<i>a</i>	<i>b</i>	
Isoxazole.....	37.42	35.95	34.49	33.02	31.56	30.10	38.88	0.1464	$\pm 0.10$
3-Methylisoxazole.....	36.35	35.13	33.91	32.69	31.47	30.26	37.57	0.1219	$\pm 0.03$
5-Methylisoxazole.....	34.38	33.12	31.86	30.60	29.34	28.09	35.64	0.1259	$\pm 0.01$
3,4-Dimethylisoxazole.....	36.85	35.76	34.66	33.57	32.47	31.38	37.95	0.1095	$\pm 0.03$
3,5-Dimethylisoxazole.....	34.10	32.89	31.69	30.48	29.27	28.06	35.31	0.1208	$\pm 0.04$
4,5-Dimethylisoxazole.....	33.91	32.81	31.72	30.62	29.53	28.44	35.00	0.1094	$\pm 0.01$
3,4,5-Trimethylisoxazole.....	34.77	33.56	32.35	31.14	29.93	28.72	35.98	0.1210	$\pm 0.02$

TABLE 57.1. Azodiformates [251]

(Maximum Bubble Pressure-A)

Azodiformate	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_\gamma$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>	
Ethyl.....	33.87	33.33	32.80	32.27	31.21	30.14	29.08	28.02	26.96	25.89	35.46	0.1063	$\pm 0.06$
Propyl.....	32.64	32.14	31.63	31.13	30.12	29.09	28.11	27.10	26.09	25.09	34.15	0.1007	$\pm 0.13$
Butyl.....	31.81	31.36	30.91	30.46	29.57	28.67	27.77	26.88	25.98	25.09	33.15	0.0896	$\pm 0.11$

TABLE 57.2. Oximes

Oxime	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_{\gamma}$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Acetaldehyde <sup>a</sup> -----	32.53	31.96	31.39	30.83	29.69	28.56	27.43				34.23	0.1134	$\pm 0.10$
Propionaldehyde <sup>a</sup> -----	30.35	29.82	29.29	28.76	27.70	26.64	25.59				31.94	0.1059	$\pm 0.08$
Butyraldehyde <sup>a</sup> -----	29.37	28.90	28.44	27.98	27.06	26.13	25.18	24.27	23.37	22.44	30.75	0.0923	$\pm 0.04$
2-Butanone <sup>a</sup> -----	30.36	29.85	29.33	28.82	27.80	26.78	25.76	24.74	23.71	22.69	31.89	0.1022	$\pm 0.06$
2-Pentanone <sup>a</sup> -----	29.37	28.90	28.44	27.97	27.04	26.10	25.17	24.24	23.31	22.37	30.77	0.0933	$\pm 0.13$
3-Pentanone <sup>a</sup> -----			28.70	28.21	27.25	26.28	25.32	24.35	23.39	22.42	31.11	0.0965	$\pm 0.08$
3-Hexanone <sup>a</sup> -----	29.16	28.70	28.25	27.80	26.89	25.98	25.07	24.16	23.26	22.35	30.52	0.0908	$\pm 0.06$
4-Heptanone <sup>a</sup> -----	28.36	27.93	27.50	27.06	26.20	25.33	24.47	23.60	22.74	21.87	29.66	0.0865	$\pm 0.09$

Oxime	Surface tension ( $\pm 0.4$ )									Least squares constants		$\sigma_{\gamma}$
	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Acetone <sup>b</sup> -----	29.26	28.28	27.30	26.32	25.34	24.35	23.37	22.41	21.42	31.23	0.09825	$\pm 0.05$
Isovaleraldehyde <sup>b</sup> -----	26.38	25.45	24.72	23.89	23.05	22.22	21.39	20.55	19.72	28.05	0.08329	$\pm 0.08$
4-Methyl-3-penten-2-one <sup>b</sup> -----	30.84	29.95	29.06	28.17	27.28	26.40	25.51	24.62	23.73	32.62	0.08892	$\pm 0.34$
Heptanal <sup>b</sup> -----	28.01	27.27	26.52	25.78	25.03	24.29	23.55	22.80	22.06	29.50	0.07442	$\pm 0.05$

<sup>a</sup> Ref. [251] (Maximum Bubble Pressure-A).<sup>b</sup> Ref. [46a] (Capillary Rise-A).TABLE 57.3. Azines of ketones [251]  
(Maximum Bubble Pressure Method)

Ketazine	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_{\gamma}$
	15°	20°	25°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Acetone-----	27.22	26.67	26.13	25.58	24.49	23.40	22.32				28.85	0.1089	$\pm 0.06$
2-Butanone-----	27.06	26.58	26.09	25.61	24.64	23.67	22.71	21.74	20.77	19.81	28.51	0.0967	$\pm 0.08$
2-Pentanone-----	27.48	27.01	26.58	26.06	25.11	24.16	23.21	22.26	21.32	20.37	28.90	0.0948	$\pm 0.04$
3-Pentanone-----	27.14	26.66	26.19	25.72	24.77	23.82	22.87	21.92	20.98	20.03	28.56	0.0948	$\pm 0.12$
3-Hexanone-----	27.05	26.61	26.17	25.73	24.85	23.97	23.10	22.22	21.34		28.37	0.0879	$\pm 0.03$
4-Heptanone-----	27.00	26.57	26.13	25.70	24.84	23.98	23.12	22.26	21.29	21.53	28.29	0.0862	$\pm 0.11$

TABLE 58.1. Aromatic ketones

Compound	Surface tension											Least squares constants		$\sigma_s$	
												$a$	$b$		
	20°	40°	60°	80°	100°	110°	120°	130°	150°	170°	200°				220 °C
2-Hydroxyacetophenone <sup>b</sup>	41.94	39.61	37.28	34.95	32.62	31.45	30.29	29.12	26.79	24.46	20.97	---	44.27	0.1165	$\pm 0.09$
4-Hydroxyacetophenone <sup>b</sup>	---	---	---	---	---	---	40.93	40.04	38.26	36.47	33.80	---	51.62	0.08909	$\pm 0.20$
3-Methyl-2,4-pentanedione <sup>e</sup>	---	30.91	28.84	26.78	24.72	23.69	22.66	---	---	---	---	---	35.03	0.1031	$\pm 0.02$
1,5-Diphenylpentanetrione <sup>b</sup>	---	---	---	---	---	34.07	33.16	32.26	30.44	28.63	---	---	44.04	0.09065	$\pm 0.20$
4-Phenyl-3-buten-2-one <sup>f</sup>	---	---	39.93	37.78	35.63	34.55	33.48	32.40	30.25	28.10	24.87	22.72	46.39	0.1076	$\pm 0.14$
Benzophenone <sup>d</sup>	44.05	41.80	39.54	37.29	35.03	33.90 <sup>a</sup>	32.77	---	---	---	---	---	46.31	0.1128	$\pm 0.02$
2,2,4,4-Tetrachlorobenzophenone <sup>e</sup>	---	---	---	---	---	---	---	---	31.62	30.55	28.95	27.88	39.64	0.05346	$\pm 0.13$
3,3,4,4-Tetrachlorobenzophenone <sup>e</sup>	---	---	38.34	36.24	34.14	33.09	32.04	---	35.39	33.64	31.01	29.26	48.54	0.08764	$\pm 0.07$
1-Phenyl-1-penten-3-one <sup>f</sup>	---	---	---	---	---	---	---	---	28.88	26.78	23.63	---	44.65	0.1051	$\pm 0.10$

<sup>a</sup> Ref. [189] (Capillary Rise Method-A) ( $\pm 0.2$ ).<sup>b</sup> Ref. [27] (Maximum Bubble Pressure-A) ( $\pm 0.2$ ).<sup>c</sup> Ref. [261] (Capillary Rise Method-A) ( $\pm 0.4$ ).<sup>d</sup> Ref. [255] (Capillary Rise Method-V) ( $\pm 0.4$ ).<sup>e</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 2.0$ ).<sup>f</sup> Ref. [71] (Capillary Rise Method-A) ( $\pm 1.5$ ).

TABLE 58.2. Aliphatic ketones [163]  
 (Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.10$ )						Least squares constants	
	25°	30°	35°	40°	45°	50 °C	<i>a</i>	<i>b</i>
2-Butanone.....	23.96	23.40	22.84	22.28	21.72	21.16	26.77	0.1122
2-Pentanone.....	23.26	22.93	22.60	22.28	21.94	21.62	24.89	0.06547
2-Hexanone.....	25.45	24.90	24.36	23.81	23.27	22.72	28.18	0.1092
2-Heptanone.....	26.12	25.59	25.06	24.53	24.01	23.48	28.76	0.10564
3-Pentanone.....	24.74	24.22	23.70	23.17	22.65	22.12	27.36	0.1047
3-Hexanone.....	25.04	24.50	23.96	23.42	22.88	22.33	27.75	0.1083
3-Heptanone.....	25.70	25.20	24.69	24.18	23.67	23.16	28.24	0.1015
3-Octanone.....	26.19	25.70	25.22	24.73	24.25	23.76	28.61	0.09696
4-Heptanone.....	25.46	24.93	24.40	23.87	23.34	22.81	28.11	0.1060
4-Octanone.....	25.72	25.29	24.86	24.43	24.00	23.57	27.88	0.08625
4-Nonanone.....	26.28	25.80	25.32	24.84	24.36	23.88	28.68	0.096
5-Nonanone.....	26.28	25.79	25.31	24.82	24.33	23.84	28.72	0.0975
5-Decanone.....	26.38	26.13	25.88	25.63	25.39	25.13	27.62	0.04971
6-Undecanone.....	27.12	26.64	26.16	25.68	25.20	24.72	29.52	0.096
Acetone <sup>a</sup> .....	24.02	22.90	22.34	21.78	21.22	20.66	26.26	0.112

<sup>a</sup> Ref. [40] ( $\pm 0.15$ ).

 TABLE 58.3. Miscellaneous ketones [41]  
 (Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.1$ )							Least squares constants		$\sigma_7$
	20°	30°	40°	50°	60°	70°	85 °C	<i>a</i>	<i>b</i>	
2-Nonanone.....	26.39	25.60	24.80	24.01	23.22	22.42	21.23	27.98	0.0794	$\pm 0.13$
3-Nonanone.....	27.43	26.49	25.54	24.59	23.64	22.69	21.27	29.33	0.0948	$\pm 0.07$
3-Decanone.....	27.82	26.93	26.05	25.16	24.27	23.39	22.06	29.59	0.0886	$\pm 0.03$
1-Phenyl-2-propanone.....	38.00	36.88	35.75	34.62	33.49	32.36	30.67	40.26	0.1128	$\pm 0.04$
1-Phenyl-2-butanone.....	36.57	35.52	34.46	33.41	32.36	31.30	29.72	38.68	0.1054	$\pm 0.04$
1-Phenyl-2-pentanone.....	34.91	33.91	32.90	31.89	30.88	29.87	28.36	36.93	0.1008	$\pm 0.06$
1-Phenyl-2-butanone.....	37.94	36.87	35.80	34.73	33.67	32.60	31.00	40.07	0.1067	$\pm 0.04$
1-Phenyl-3-pentanone.....	36.52	35.51	34.50	33.48	32.47 <sup>2</sup>	31.46	29.95	38.54	0.1011	$\pm 0.09$
1-Phenyl-3-hexanone.....	34.83	33.85	32.88	31.90	30.93	29.95	28.49	36.78	0.0975	$\pm 0.09$
Acetophenone.....	39.61	38.46	37.30	36.15	35.00	33.84	32.11	41.92	0.1154	$\pm 0.06$
Propiophenone.....	37.37	36.30	35.23	34.16	33.09	32.02	30.41	39.51	0.1070	$\pm 0.06$
Butyrophenone.....	35.49	34.54	33.58	32.62	31.66	30.70	29.27	37.41	0.0958	$\pm 0.11$

**SURFACE TENSION OF LIQUIDS**

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TABLE 59.1. Azine of anisaldehyde [59]  
(Horizontal Capillary Pressure-A)

Surface tension ( $\pm 0.15$ ) (transition temperature 180.5 °C)														
169°	172°	174°	176°	178°	179°	179.5°	180°	181.5°	183.5°	186°	189°	194°	199°	204 °C
32.97	30.82	30.04	29.34	29.65	29.90	30.23	30.50	30.38	30.03	30.09	29.75	29.25	28.85	28.42

TABLE 59.2. 4,4'-Azoxydiphenetole [196]  
(Ring Detachment-A)

Surface tension ( $\pm 0.10$ ) (transition temperature 168.3°-168.6 °C)															
141.2°	158.3°	159.8°	164.2°	166.8°	168.3°	168.5°	168.6°	168.8°	169.8°	170.7°	172.2°	174.7°	181.9°	190.8°	198.0 °C
31.5	29.8	29.7	29.2	29.1	28.8	28.8	28.8	28.8	28.8	28.6	28.5	28.3	27.6	27.0	26.4

TABLE 59.3. Ethyl 4,4'-azoxydibenzoate [196]  
(isotropic phase)  
(Ring Detachment-A)

Surface tension ( $\pm 0.10$ ) (transition temperature 122.6 °C)															
123.0°	125.4°	127.1°	130.5°	135.0°	140.0°	146.3°	149.7°	155.0°	160.2°	166.5°	170.8°	177.2°	181.0°	191.4°	200.7 °C
26.6	26.8	27.1	27.3	27.3	27.4	27.6	27.7	27.7	27.6	27.6	27.6	27.3	27.1	26.5	25.9

TABLE 60. Mercury

Surface tension ( $\pm 2.0$ )														Least squares constants	
5°	10°	15°	20°	25°	30°	35°	40°	50°	60°	80°	100°	150°	200 °C	a	b
489.6	488.6	487.5	486.5	485.5	484.5	483.4	482.4	480.4	478.3	474.2	470.1	459.9	449.6	490.6	0.2049

Ref. [184] (Sessile Drop-V).  
Ref. [18] (Maximum Bubble Pressure-CO<sub>2</sub>).

Ref. [123] (Sessile Drop-V).

TABLE 61.1. Alkyl 1-naphthoates and 2-naphthoates [4]  
(Maximum Bubble Pressure Method-A)

Alkyl 1-naphthoates	Surface tension ( $\pm 0.20$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Methyl.....	44.09	41.99	39.90	37.28	46.18	0.1047	$\pm 0.06$
Ethyl.....	41.37	39.19	37.00	34.28	43.55	0.1091	$\pm 0.03$
Propyl.....	39.60	37.71	35.81	33.44	41.50	0.0948	$\pm 0.10$
Butyl.....	38.18	36.44	34.69	32.51	39.93	0.0873	$\pm 0.09$
Pentyl.....	37.20	35.44	33.67	31.47	38.96	0.0881	$\pm 0.03$
Hexyl.....	36.58	34.92	33.25	31.18	38.24	0.0831	$\pm 0.07$
Heptyl.....	35.87	34.28	32.70	30.72	37.45	0.0792	$\pm 0.03$

Alkyl 2-naphthoates	Surface tension ( $\pm 0.20$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Ethyl.....	41.64	39.43	37.23	34.47	43.85	0.1104	$\pm 0.11$
Propyl.....	38.59	36.96	35.33	33.29	40.22	0.0815	$\pm 0.34$
Butyl.....	36.21	36.21	34.41	32.16	39.81	0.0900	$\pm 0.05$
Pentyl.....	37.20	35.51	33.81	31.69	38.90	0.0848	$\pm 0.06$
Hexyl.....	36.79	35.14	33.50	31.44	38.44	0.0824	$\pm 0.03$
Heptyl.....		34.66	33.08	31.10	37.83	0.0792	$\pm 0.21$

TABLE 61.2. Alkyl 1-naphthaleneacetates and 2-naphthaleneacetates [4]  
(Maximum Bubble Pressure-A)

Alkyl 1-naphthaleneacetates	Surface tension ( $\pm 0.2$ ) <sup>a</sup>				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Methyl.....	45.14	43.00	40.85	38.18	47.28	0.1071	$\pm 0.06$
Ethyl.....	41.09	39.01	36.92	34.32	43.17	0.1041	$\pm 0.05$
Propyl.....	38.88	36.96	35.06	32.65	40.80	0.0959	$\pm 0.02$
Butyl.....	37.61	35.80	33.99	31.73	39.42	0.0905	$\pm 0.05$
Pentyl.....	36.34	34.63	32.92	30.78	38.05	0.0855	$\pm 0.04$
Hexyl.....	35.79	34.15	32.51	30.46	37.43	0.0820	$\pm 0.12$
Heptyl.....	35.18	33.60	32.01	30.03	36.77	0.0793	$\pm 0.06$

TABLE 61.2. Alkyl 1-naphthaleneacetates and 2-naphthaleneacetates [4]—Continued

(Maximum Bubble Pressure-A)

Alkyl 2-naphthaleneacetates	Surface tension ( $\pm 0.2$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....	43.85	41.45	39.04	36.03	46.26	0.1203	$\pm 0.18$
Ethyl.....	40.67	38.66	36.65	34.14	42.68	0.1005	$\pm 0.04$
Propyl.....	38.81	36.89	34.98	32.59	40.72	0.0957	$\pm 0.05$
Butyl.....	37.75	35.97	34.18	31.95	39.54	0.0893	$\pm 0.11$
Pentyl.....	37.04	35.37	33.70	31.61	38.71	0.0835	$\pm 0.15$
Hexyl.....	36.22	34.64	33.05	31.08	37.80	0.0791	$\pm 0.06$
Heptyl.....	35.69	34.09	32.49	30.40	37.29	0.0800	$\pm 0.05$

TABLE 61.3. Alkyl 1-naphthyl ketones [4]

(Maximum Bubble Pressure-A)

Alkyl 1-naphthyl ketones	Surface tension* ( $\pm 0.2$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
1-Acetonaphthone.....	46.16	43.97	41.79	39.06	48.34	0.1092	$\pm 0.12$
1-Propionaphthone.....	43.49	41.42	39.34	36.75	45.57	0.1038	$\pm 0.07$
Propyl.....	41.45	39.64	37.84	35.58	43.25	0.0902	$\pm 0.13$
Butyl.....	39.31	37.73	36.16	34.19	40.88	0.0787	$\pm 0.12$
Pentyl.....	38.56	36.94	35.33	33.31	40.17	0.0807	$\pm 0.14$
Hexyl.....	36.47	34.90	33.32	31.36	38.04	0.0786	$\pm 0.07$
Heptyl.....	36.77	35.31	33.85	32.02	38.23	0.0730	$\pm 0.06$

TABLE 61.4. Alkyl naphthalenes, vinyl naphthalene, and naphthalene [4]

(Maximum Bubble Pressure-A)

1-Alkyl naphthalenes	Surface tension ( $\pm 0.2$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Ethyl.....	38.47	36.44	34.42	31.88	40.50	0.1014	$\pm 0.04$
Propyl.....	36.70	34.85	32.99	30.68	38.55	0.0926	$\pm 0.11$
Butyl.....	35.69	33.91	32.12	29.90	37.47	0.0891	$\pm 0.02$
Pentyl.....	35.18	33.35	31.51	29.22	37.02	0.0918	$\pm 0.06$
Hexyl.....	35.06	33.18	31.31	28.96	36.94	0.0939	$\pm 0.11$
Heptyl.....	34.59	32.94	31.30	29.24	36.24	0.0824	$\pm 0.01$
Octyl.....	34.23	32.67	31.10	29.14	35.80	0.0783	$\pm 0.03$

TABLE 61.4. Alkyl naphthalenes, vinyl naphthalene, and naphthalene [4]—Continued

2-Alkyl naphthalenes	Surface tension ( $\pm 0.2$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Ethyl.....	37.10	35.08	33.07	30.54	39.12	0.1009	$\pm 0.11$
Propyl.....	35.70	33.85	31.99	29.67	37.56	0.0928	$\pm 0.01$
Butyl.....	35.32	33.58	31.83	29.66	37.06	0.0871	$\pm 0.06$
Pentyl.....	34.58	32.93	31.27	29.21	36.23	0.0826	$\pm 0.03$
Hexyl.....	33.95	32.33	30.72	28.70	35.56	0.0807	$\pm 0.03$
Heptyl.....	33.85	32.21	30.56	28.51	35.49	0.0821	$\pm 0.05$
Octyl.....	33.68	32.09	30.49	28.50	35.27	0.0796	$\pm 0.01$

## 1-Vinyl naphthalene [45]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.40$ )								Least squares constants	
100°	110°	120°	130°	140°	160°	180°	200 °C	a	b
35.09	34.11	33.13	32.16	31.18	29.22	27.27	25.31	44.87	0.0987

## Naphthalene [45, 46]

(Capillary Rise Method-V)

Surface tension ( $\pm 1.0$ )							Least squares constants	
90°	100°	120°	140°	160°	180°	200 °C	a	b
32.88	31.77	29.56	27.34	25.13	22.91	20.70	42.84	0.1107



TABLE 61.5. *cis*- and *trans*-Decahydronaphthalene [199]

(Capillary Rise Method-A)

Temperature centigrade	Surface tension ( $\pm 0.4$ )	
	<i>cis</i>	<i>trans</i>
-30	38.02	35.29
-20	36.83	34.14
-10	35.65	32.95
0	34.50	31.91
10	33.36	30.87
20	32.18	29.89
30	31.01	28.87
40	29.81	27.81
50	28.63	26.77
60	27.67	25.82
70	26.82	24.82
80	25.88	23.95
90	24.95	23.02
100	24.04	22.02
110	23.14	21.05
120	22.25	20.22
130	21.38	19.39
140	20.56	18.65
150	19.76	17.85
160	18.89	16.98
170	18.04	16.17
180	17.18	15.44

TABLE 61.6. Miscellaneous naphthalene compounds [4]

(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.2$ )				Least squares constants		$\sigma_7$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
1-Fluoronaphthalene	38.21	36.05	33.88	31.17	40.38	0.1083	$\pm 0.06$
1-Chloronaphthalene	42.05	39.98	37.91	35.32	44.12	0.1035	$\pm 0.01$
1-Bromonaphthalene	44.40	42.37	40.33	37.79	46.44	0.1018	$\pm 0.04$
1-Iodonaphthalene	47.15	44.96	42.76	40.02	49.35	0.1098	$\pm 0.13$
1-Naphthonitrile	46.40	44.32	42.23	39.63	48.48	0.1041	$\pm 0.10$
1,2-Dimethylnaphthalene	39.24	37.26	35.28	32.81	41.22	0.0990	$\pm 0.06$
1,6-Dimethylnaphthalene	37.35	35.49	33.63	31.30	39.21	0.0930	$\pm 0.06$
1-Naphthalenecarbonitrile	48.95	46.89	44.84	42.27	51.00	0.1027	$\pm 0.04$
1-(Chloromethyl)naphthalene	45.46	43.45	41.45	38.94	47.47	0.1004	$\pm 0.04$
1-Methoxynaphthalene	42.84	40.71	38.57	35.91	44.97	0.1066	$\pm 0.07$
2-Isopropylnaphthalene	35.01	33.31	31.62	29.49	36.71	0.0849	$\pm 0.15$
2- <i>tert</i> -Butylnaphthalene	34.18	32.50	30.81	28.71	35.86	0.0841	$\pm 0.12$
1,2,3,4-Tetrahydronaphthalene	33.64	31.73	29.83	27.44	35.55	0.0954	$\pm 0.01$

TABLE 62. Nitrobenzene and some nitro and halonitro derivatives  
 (Maximum Bubble Pressure)

Compound	Surface tension									Least squares constants		$\sigma_T$
	40°	60°	80°	100°	120°	140°	160°	180°	200 °C	a	b	
Nitrobenzene <sup>a</sup>	41.71	39.40	37.08	34.77	32.46	30.14	27.83	25.51	23.20	46.34	0.1157	±0.30
<i>o</i> -Dinitrobenzene <sup>b</sup>					38.76	36.99	35.21	33.44	31.76	49.42	0.0888	±0.13
<i>m</i> -Dinitrobenzene <sup>b</sup>				41.60	39.69	37.78	35.87	33.96	32.05	51.15	0.0955	±0.14
<i>p</i> -Dinitrobenzene <sup>b</sup>					38.86	37.24	35.63	34.01	32.40	48.54	0.0807	±0.09
<i>m</i> -Fluoronitrobenzene <sup>b</sup>	35.98	34.08	32.19	30.30	28.41	26.52	24.62	22.73	20.84	39.76	0.0946	±0.11
<i>p</i> -Fluoronitrobenzene <sup>b</sup>	36.57	34.44	32.32	30.19	28.06	25.94	23.81	21.69	19.56	40.82	0.1063	±0.08
<i>o</i> -Chloronitrobenzene <sup>d</sup>	43.42	41.07	38.73	36.39	34.05	31.71	29.36	27.02		48.10	0.1171	±0.11
<i>m</i> -Chloronitrobenzene <sup>d</sup>	44.04	41.21	38.37	35.54	32.71	29.87	27.04	24.20		49.71	0.1417	±0.52
<i>p</i> -Chloronitrobenzene <sup>a</sup>				35.38	33.29	31.20	29.10	27.01	24.92	45.84	0.1046	±0.06
<i>o</i> -Bromonitrobenzene <sup>d</sup>		42.77	40.68	38.59	36.50	34.41	32.33	30.24		49.03	0.1044	±0.18
<i>m</i> -Bromonitrobenzene <sup>d</sup>		42.83	40.36	37.88	35.40	32.93	30.45	27.98		50.26	0.1238	±0.07
<i>p</i> -Bromonitrobenzene <sup>d</sup>						33.62	31.73	29.83	27.94	46.89	0.09476	±0.13
<i>o</i> -Iodonitrobenzene <sup>b</sup>		43.15	41.24	39.33	37.42	35.51	33.60	31.70	29.79	48.88	0.09547	±0.10
<i>m</i> -Iodonitrobenzene <sup>b</sup>	45.39	43.38	41.36	39.34	37.32	35.30	33.29	31.27	29.25	49.43	0.1009	±0.08
1,2-Dichloro-4-nitrobenzene <sup>b</sup>		38.85	37.02	35.18	33.35	31.52	29.68	27.85	26.02	44.35	0.09166	±0.09
1,3-Dichloro-4-nitrobenzene <sup>b</sup>	40.77	38.77	36.77	34.78	32.78	30.78	28.78	26.78	24.78	44.77	0.09994	±0.05
1,4-Dichloro-2-nitrobenzene <sup>b</sup>		38.54	36.67	34.80	32.92	31.05	29.18	27.30	25.43	44.16	0.09364	±0.12
<i>o</i> -Nitrotoluene <sup>d</sup>	39.31	36.97	34.62	32.27	29.92	27.57	25.23			44.01	0.1174	±0.07
<i>m</i> -Nitrotoluene <sup>d</sup>	39.07	36.83	34.60	32.36	30.12	27.89	25.65			43.54	0.1118	±0.07
<i>p</i> -Nitrotoluene <sup>a</sup>		36.41	34.47	32.52	30.57	28.62	26.67	24.72	22.78	42.26	0.09742	±0.12
2,4,6-Trinitrotoluene <sup>c</sup>			47.09	45.09	43.14	41.16	39.19	37.21	35.23	54.99	0.09878	±0.04
<i>m</i> -Nitroaniline <sup>b</sup>					43.14	41.28	39.42	37.56	35.69	54.31	0.09308	±0.04
<i>p</i> -Nitroaniline <sup>b</sup>							45.86	44.01	42.17	60.62	0.09225	±0.01
1,2-Dimethoxy-4,5-dinitrobenzene <sup>b</sup>						40.11	37.71	35.30	32.89	56.97	0.1204	±0.05
1-Chloro-2,4-dinitrobenzene <sup>b</sup>		45.59	43.64	41.70	39.75	37.81	35.86	33.92	31.97	51.42	0.09724	±0.07
4-Chloro-1,2-dinitrobenzene <sup>c</sup>	12.50	9.50	6.50							18.50	0.1500	
4-Bromo-1,2-dinitrobenzene <sup>c</sup>	13.00	12.50	12.00	11.50						14.00	0.0250	
<i>N</i> -Methyl- <i>p</i> -nitroaniline <sup>b</sup>							46.01	43.79	41.56	63.82	0.1113	±0.42
4-Nitro- <i>o</i> -toluidine <sup>b</sup>							43.32	40.16	37.01	33.86	65.38	0.1576
6-Nitro- <i>o</i> -toluidine <sup>b</sup>				39.67	37.90	36.13	34.37	32.60	30.83	48.50	0.08834	±0.03
2-Nitro- <i>p</i> -toluidine <sup>b</sup>					36.42	34.36	32.31	30.25	28.20	48.74	0.1027	±0.10
2-Nitroresorcinol <sup>b</sup>				38.45	36.26	34.06	31.87	29.67		49.42	0.1097	±0.04

<sup>a</sup> Ref. [215] (A) (±1.0).<sup>b</sup> Ref. [108] (N<sub>2</sub>) (±2.0).<sup>c</sup> Ref. [131] (A) (±0.2).<sup>d</sup> Ref. [217] (A) (±1.0).<sup>e</sup> Ref. [156] (Capillary Rise Method-A) (±3.0).

TABLE 63.1. Nitrous and nitric esters [250]

(Capillary Rise Method-A)

Compound	Surface tension (±0.1)						Least squares constants		$\sigma_T$
	15°	25°	35°	45°	55°	65 °C	a	b	
Butyl nitrite	31.74	30.67	29.60	28.53			33.35	0.1070	±0.11
Pentyl nitrite	23.28	22.21	21.14	20.07	19.00		24.89	0.1070	±0.08
Hexyl nitrite	24.36	23.35	22.35	21.35	20.34	19.34	25.86	0.1003	±0.07
Ethyl nitrate	28.79	27.45	26.10	24.76			30.81	0.1345	±0.03
Propyl nitrate	27.81	26.58	25.34	24.10	22.87	21.63	29.67	0.1237	±0.10
Butyl nitrate	28.66	27.53	26.41	25.28	24.16	23.03	30.35	0.1126	±0.09

TABLE 63.2.  $\alpha, \omega$ -Alkane dinitric esters [266]

(Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.15$ )						Least squares constants	
	0°	10°	15°	25°	35°	45 °C	<i>a</i>	<i>b</i>
Ethylene nitrate.....	49.1					46.7		
Propylene nitrate.....	48.8	47.2	46.4	44.8	43.3	41.7	48.8	0.1575
Tetramethylene nitrate.....	46.2	45.0	44.4	43.2	42.0	40.8	46.2	0.1199
Pentamethylene nitrate.....	45.6	45.3	43.7	42.4	41.2	39.9	45.6	0.1270
Hexamethylene nitrate.....	43.1	42.2	41.6	40.7	39.8	38.8	43.1	0.0950
Heptamethylene nitrate.....	42.0	41.1	40.6	39.6	38.7	37.7	42.0	0.0964
Octamethylene nitrate.....	40.6	39.8	39.4	38.6	37.8	37.0	40.6	0.0794
Nonamethylene nitrate.....	40.4	39.6	39.2	38.4	37.5	36.7	40.4	0.0816
Decamethylene nitrate.....	39.6	38.9	38.6	37.9	37.3	36.6	39.6	0.0671

TABLE 64. Nicotine [197]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.5$ )													Least squares constants	
-40°	-30°	-20°	-10°	10°	20°	30°	40°	50°	60°	70°	80°	90 °C	<i>a</i>	<i>b</i>
45.52	44.41	43.29	42.19	39.96	38.85	37.73	36.62	35.51	34.40	33.29	32.17	31.06	41.07	0.1112

TABLE 65. Nickel carbonyl [127]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.10$ )							Least squares constants		$\sigma_\gamma$
5°	10°	15°	20°	25°	30°	35 °C	<i>a</i>	<i>b</i>	
17.55	16.99	16.43	15.88	15.32	14.76	14.20	18.11	0.1117	$\pm 0.01$

TABLE 66. Nitroparaffins and trichloronitromethane

## Nitroparaffins [206]

(Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.1$ )									Least squares constants		$\sigma_\gamma$
	10°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Nitromethane.....	39.12	37.48	35.47	34.02	32.34	30.72	28.97	-----	-----	40.72	0.1678	$\pm 0.06$
Nitroethane.....	33.88	32.66	31.50	30.24	28.95	27.83	26.49	-----	-----	35.27	0.1255	$\pm 0.06$
1-Nitropropane.....	31.68	30.64	29.61	28.48	27.66	26.53	25.56	-----	-----	32.62	0.1009	$\pm 0.06$
2-Nitropropane.....	31.08	29.87	28.68	27.54	26.41	25.22	24.07	-----	-----	32.18	0.1158	$\pm 0.06$
1-Nitrobutane.....	30.80	29.77	28.68	27.98	26.99	26.02	25.03	-----	-----	31.74	0.0959	$\pm 0.06$
2-Nitrobutane.....	30.62	29.53	28.44	27.36	26.28	25.19	24.11	-----	-----	31.70	0.1085	$\pm 0.06$
1-Nitropentane <sup>a</sup> .....	30.26	29.31	28.36	27.41	26.46	25.51	24.57	23.62	22.67	31.21	0.09492	$\pm 0.07$
1-Nitrohexane <sup>a</sup> .....	30.42	29.54	28.67	27.79	26.91	26.03	25.16	24.28	23.40	31.30	0.08777	$\pm 0.10$
2-Methyl-1-nitropropane.....	29.42	28.37	27.49	26.52	25.56	24.60	23.64	-----	-----	30.35	0.0958	$\pm 0.06$
2-Methyl-2-nitropropane.....	-----	-----	27.38	26.33	25.29	24.26	-----	-----	-----	30.48	0.1038	$\pm 0.06$

<sup>a</sup> Ref. [250] (Capillary Rise Method-A) ( $\pm 0.10$ ).

## Trichloronitromethane [192]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.6$ )											Least squares constants		$\sigma_\gamma$
-10°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
36.32	33.66	32.34	31.01	29.69	28.36	27.03	25.71	24.38	23.06	21.73	34.99	0.1326	$\pm 0.03$

TABLE 67.1. Trialkyl phosphites and tris(2-alkoxyethyl) phosphites [65]

(Maximum Bubble Pressure Method-A)

Trialkyl phosphites	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	a	b	
Methyl.....	27.18	24.88	-----	-----	-----	-----	$\pm 0.00$
Ethyl.....	23.95	22.20	20.46	18.27	25.73	0.0878	$\pm 0.11$
Propyl.....	25.06	23.29	21.52	19.31	26.83	0.0885	$\pm 0.02$
Butyl.....	25.84	24.11	22.38	20.22	27.57	0.0865	$\pm 0.20$
Pentyl.....	26.92	25.23	23.55	21.44	28.61	0.0844	$\pm 0.13$
Hexyl.....	27.54	25.93	24.31	22.31	29.15	0.0805	$\pm 0.01$
Heptyl.....	28.15	26.56	24.98	23.00	29.73	0.0792	$\pm 0.07$
Octyl.....	28.31	26.81	25.32	23.44	29.81	0.0749	$\pm 0.12$

TABLE 67.1. Trialkyl phosphites and tris(2-alkoxyethyl) phosphites [65]—Continued  
(Maximum Bubble Pressure Method-A)

Tris(2-alkoxyethyl)phosphites	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	$a$	$P$	
Methoxy.....	33.94	31.89	29.84	27.28	35.99	0.1025	$\pm 0.02$
Ethoxy.....	30.62	28.71	26.80	24.41	32.53	0.0955	$\pm 0.09$
Propoxy.....	28.94	27.35	25.77	23.78	30.53	0.0794	$\pm 0.08$
Butoxy.....	29.33	27.71	26.10	24.08	30.94	0.0807	$\pm 0.08$
Pentoxy.....	29.62	27.90	26.19	24.05	31.33	0.0857	$\pm 0.04$
Hexoxy.....	29.91	28.22	26.52	24.41	31.60	0.0846	$\pm 0.07$

TABLE 67.2. Phosphonates [65]<sup>a</sup>  
(Maximum Bubble Pressure Method-A)

Dialkyl phosphonates	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	$a$	$b$	
Methyl.....	37.58	35.21	32.84	29.88	39.95	0.1185	$\pm 0.05$
Ethyl.....	30.96	28.88	26.79	24.18	33.05	0.1043	$\pm 0.08$
Propyl.....	29.25	27.43	25.61	23.33	31.07	0.0910	$\pm 0.04$
Butyl.....	28.24	26.80	25.36	23.56	29.68	0.0720	$\pm 0.04$
Pentyl.....	28.51	26.90	25.30	23.29	30.11	0.0802	$\pm 0.05$
Hexyl.....	28.73	27.19	25.66	23.74	30.26	0.0767	$\pm 0.05$
Heptyl.....	28.72	27.27	25.83	24.02	30.16	0.0722	$\pm 0.08$
Octyl.....	28.97	27.57	26.16	24.41	30.38	0.0703	$\pm 0.03$

Bis(2-alkoxyethyl)phosphonates	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	$a$	$b$	
Methoxy.....	37.87	35.80	33.74	31.16	39.93	0.1032	$\pm 0.20$
Ethoxy.....	33.96	31.82	29.69	27.01	36.10	0.1069	$\pm 0.19$
Propoxy.....	30.97	29.64	28.30	26.64	32.30	0.0666	$\pm 0.18$
Butoxy.....	30.96	29.90	28.83	27.51	32.02	0.0531	$\pm 0.15$
Pentoxy.....	30.94	29.61	28.28	26.62	32.27	0.0665	$\pm 0.17$
Hexoxy.....	31.18	29.82	28.45	26.74	32.54	0.0682	$\pm 0.02$
Heptoxy.....	30.95	29.52	28.08	26.29	32.38	0.0716	$\pm 0.11$

TABLE 67.2. Phosphonates [65]—Continued  
 (Maximum Bubble Pressure Method-A)

Dialkyl ethylphosphonates	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_T$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....	36.63	34.10	31.58	28.42	39.15	0.1262	$\pm 0.13$
Ethyl.....	28.68	26.73	24.78	22.34	30.63	0.0975	$\pm 0.00$
Propyl.....	28.25	26.45	24.66	22.41	30.05	0.0899	$\pm 0.10$
Butyl.....	28.05	26.40	24.76	22.70	29.70	0.0824	$\pm 0.03$
Pentyl.....	27.97	26.34	24.71	22.67	29.60	0.0815	$\pm 0.09$
Hexyl.....	28.07	26.70	25.32	23.60	29.45	0.0688	$\pm 0.10$
Heptyl.....	28.47	27.08	25.68	23.93	29.87	0.0699	$\pm 0.03$
Octyl.....	28.99	27.25	25.52	23.34	30.73	0.0869	$\pm 0.28$

Dipropyl alkylphosphonates	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_T$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....	28.57	26.75	24.94	22.66	30.39	0.0909	$\pm 0.07$
Propyl.....	27.97	26.19	24.41	22.18	29.75	0.0890	$\pm 0.03$
Butyl.....	28.02	26.26	24.50	22.30	29.78	0.0880	$\pm 0.06$
Pentyl.....	28.20	26.49	24.77	22.63	29.92	0.0858	$\pm 0.09$
Hexyl.....	28.06	26.62	25.17	23.36	29.51	0.0723	$\pm 0.03$
Heptyl.....	28.54	26.88	25.22	23.14	30.20	0.0830	$\pm 0.04$
Octyl.....	28.77	27.06	25.36	23.23	30.47	0.0852	$\pm 0.06$

TABLE 67.3. Orthophosphates [65]  
(Maximum Bubble Pressure Method-A)

Orthophosphates	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_7$
	20°	40°	60°	85 °C	a	b	
Butyl.....	27.38	26.05	24.71	23.05	28.71	0.0666	$\pm 0.19$
Pentyl.....	26.87	25.88	24.88	23.63	27.87	0.0498	$\pm 0.23$
Hexyl.....	28.05	26.56	25.06	23.20	29.54	0.0746	$\pm 0.05$
Heptyl.....	28.04	26.67	25.29	23.57	29.42	0.0688	$\pm 0.09$
2-Methoxyethyl.....	36.61	34.61	32.61	30.11	38.61	0.1000	$\pm 0.05$
2-Ethoxyethyl.....	32.20	30.41	28.63	26.40	33.98	0.0892	$\pm 0.06$

Trialkyl orthophosphates [237]  
(Capillary Rise Method-A)

Orthophosphate	Surface tension ( $\pm 0.10$ )											Least squares constants		$\sigma_7$
	15°	20°	30°	40°	50°	60°	70°	80°	90°	100°	120 °C	a	b	
Trimethyl.....	38.05	37.48	36.34	35.21	34.07	32.93	31.80	30.66	29.53	28.39	26.12	39.75	0.1136	$\pm 0.04$
Triethyl.....	30.42	29.95	29.03	28.10	27.17	26.24	25.31	24.39	23.46	22.53	20.67	31.81	0.0928	$\pm 0.14$
Tripropyl.....	29.53	29.08	28.18	27.29	26.39	25.50	24.60	23.71	22.81	21.92	20.13	30.87	0.0895	$\pm 0.11$
Tributyl.....	25.56	25.14	24.32	23.50	22.67	21.85	21.03	20.21	19.38	18.56	16.91	26.79	0.0823	$\pm 0.17$
Triisopropyl.....	28.35	27.96	27.18	26.39	25.61	24.83	24.04	23.26	22.47	21.69	20.12	29.53	0.0784	$\pm 0.23$
Triisobutyl.....	26.80	26.40	25.61	24.81	24.01	23.21	22.41	21.62	20.82	20.02	18.42	28.00	0.0798	$\pm 0.11$

TABLE 67.4. Dioxaphospholanes [65]  
(Maximum Bubble Pressure Method-A)

2-Alkoxy-4-methyl-1,2,3-dioxaphospholanes	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_7$
	20°	40°	60°	85 °C	a	b	
Methoxy.....	29.65						
Ethoxy.....	27.75	26.08	24.42	22.34	29.41	0.0832	$\pm 0.00$
Propoxy.....	28.06	26.64	25.22	23.44	29.48	0.0710	$\pm 0.07$
Butoxy.....	28.32	26.53	24.73	22.49	30.11	0.0896	$\pm 0.03$
Pentoxy.....	28.24	26.77	25.31	23.48	29.70	0.0732	$\pm 0.14$
Hexoxy.....	28.39	26.83	25.26	23.30	29.96	0.0783	$\pm 0.08$

TABLE 68. Palladium and mercury complex compounds [145]  
 (Max. Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.1$ )												Least squares constants		$\sigma_7$			
	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°	150°		160 °C	a	b
	Bis(dimethyl sulfide)— palladium dichloride												43.70	43.14		42.58	51.57	0.0562
Bis(diethyl sulfide)— palladium dichloride								38.83	37.99	37.15	36.30	35.46			46.43	0.08439	$\pm 0.16$	
Bis(dipropyl sulfide)— palladium dichloride					35.49	34.58	33.67	32.77	31.86	30.95	30.05				40.93	0.0907	$\pm 0.29$	
Bis(dibutyl sulfide)— palladium dichloride				33.07	32.30	31.53	30.76	29.99	29.22						36.92	0.07698	$\pm 0.02$	
Bis(disobutyl sulfide)— palladium dichloride								28.70	28.06	27.42	26.77	26.13			34.50	0.0644	$\pm 0.08$	
Bis(dipentyl sulfide)— palladium dichloride				30.78	30.06	29.34	28.62	27.90	27.18	26.46					34.39	0.0721	$\pm 0.05$	
Bis(tripropyl phosphine)— palladium dichloride								28.14	27.39	26.65	25.90	25.16	24.41	23.66	34.86	0.07465	$\pm 0.01$	
Bis(tributyl phosphine)— palladium dichloride						27.93	27.20	26.48	25.76	25.04	24.32	23.59	22.87	22.15	32.98	0.0722	$\pm 0.07$	
Bis(tributyl phosphine)— palladium dibromide						28.77	27.86	26.94	26.03						35.17	0.0914	$\pm 0.01$	
Bis(triethylarsine)— palladium dichloride											30.81	30.02	29.23	28.43	40.33	0.0793	$\pm 0.01$	
Bis(tripropylarsine)— palladium dichloride					31.03	30.26	29.49	28.72	27.95	27.18					35.66	0.0771	$\pm 0.01$	
Bis(tributylarsine)— palladium dichloride					28.82	28.16	27.50	26.84	26.18	25.52					32.77	0.0659	$\pm 0.01$	
Bi(tripentylarsine)— palladium dichloride	31.38	30.66	29.95	29.24	28.53	27.82	27.10	26.39	25.68	24.97					32.80	0.0712	$\pm 0.50$	
Bis(tripropylarsine)— palladium dibromide				32.57	31.73	30.90	30.06	29.23							36.75	0.0836	$\pm 0.10$	
Dipentyl sulfide— palladium								26.82	25.98	25.14	24.31	23.47			34.34	0.0836	$\pm 0.02$	
Diethyl sulfide— mercury						37.65	37.03	36.41	35.79						41.98	0.0619	$\pm 0.01$	
Dipropyl sulfide— mercury						31.09	30.55	30.02	29.49						34.81	0.0532	$\pm 0.01$	
Dipentyl sulfide— mercury						26.86	26.32	25.79	25.25						30.61	0.0536	$\pm 0.01$	
Dihexyl sulfide— mercury						25.96	25.39	24.83	24.26						29.93	0.0567	$\pm 0.01$	



Diheptyl sulfide— mercury	25.28	24.84	24.41	23.98						28.30	0.0432	±0.01
Dioctyl sulfide— mercury	25.39	24.91	24.44	23.96						28.73	0.0477	±0.01

TABLE 69.1. Phenyl sulfide and selenide [237]

	Surface tension ( $\pm 0.10$ )										Least squares constants		$\sigma_{\gamma}$
	20°	30°	40°	50°	60°	70°	80°	90°	100°	120 °C	a	b	
Phenyl sulfide.....	24.25	41.26	40.26	39.27	38.28	37.28	36.29	35.29	34.30	32.31	44.24	0.0994	$\pm 0.12$
Phenyl selenide.....	43.63	42.63	41.62	40.61	39.60	38.59	37.59	36.58	35.57	33.55	45.64	0.1008	$\pm 0.22$

TABLE 69.2. Phenyl compounds and related compounds

Phenyl compounds [245]

(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.1$ )									Least squares constants		$\sigma_{\gamma}$
	15°	20°	30°	40°	50°	60°	70°	80°	90 °C	a	b	
Methyl benzoate.....	38.34	37.76	36.59	35.42	34.24	33.07	31.90	30.73	29.56	40.10	0.1171	$\pm 0.09$
Ethyl benzoate.....	35.57	35.04	33.98	32.92	31.86	30.81	29.75	28.69	27.63	37.16	0.1059	$\pm 0.08$
Propyl benzoate.....	34.95	34.41	33.34	32.27	31.20	30.14	29.07	28.00	26.93	36.55	0.1069	$\pm 0.16$
Butyl benzoate.....	-----	33.67	32.70	31.74	30.78	29.82	28.86	27.89	26.93	35.59	0.0962	$\pm 0.07$
Methyl phenylacetate.....	38.70	38.32	36.95	35.79	34.62	33.45	32.29	31.12	29.96	40.45	0.1166	$\pm 0.10$
Ethyl phenylacetate.....	35.90	35.36	34.26	33.16	32.06	30.97	29.87	28.77	27.68	37.55	0.1097	$\pm 0.08$
Propyl phenylacetate.....	34.79	34.29	33.28	32.27	31.25	30.24	29.23	28.22	27.21	36.31	0.1011	$\pm 0.07$
Butyl phenylacetate.....	-----	33.33	32.35	31.38	30.40	29.43	28.45	27.48	26.50	35.28	0.0975	$\pm 0.02$
Methyl hydrocinnamate.....	37.97	37.30	36.30	35.19	34.07	32.96	31.85	30.74	29.62	39.64	0.1113	$\pm 0.04$
Ethyl hydrocinnamate.....	-----	35.02	33.19	32.95	31.92	30.89	29.85	28.82	27.78	37.09	0.1034	$\pm 0.05$
Propyl hydrocinnamate.....	-----	34.17	33.13	32.09	31.05	30.02	28.98	27.94	26.91	36.24	0.1037	$\pm 0.07$
Butyl hydrocinnamate.....	-----	33.49	32.56	31.62	30.69	29.76	28.82	27.89	26.95	35.36	0.0934	$\pm 0.05$
1-Methylnaphthalene.....	38.56	38.09	37.16	36.22	35.29	34.36	33.42	32.49	31.55	39.96	0.0934	$\pm 0.03$

Phenyl salicylate [8]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.10$ )							Least squares constants	
30°	35°	40°	45°	50°	55°	60 °C	a	b
42.27	41.78	41.30	40.81	40.32	39.83	39.34	45.20	0.0976

TABLE 69.3. Triphenyl compounds of group V<sub>B</sub> elements [62]

(Capillary Rise-A)

Compound	Surface tension ( $\pm 0.1$ )										Least squares constants		$\sigma_{\gamma}$
	65°	75°	85°	100°	125°	150°	175°	200°	225°	250 °C	a	b	
Triphenylamine.....					34.3	31.9	29.5	27.1	24.7		46.2	0.0955	$\pm 0.21$
Triphenylphosphine.....			37.4	36.0	33.8	31.5	29.3	27.0	24.7		45.1	0.0905	$\pm 0.10$
Triphenylbismuthine.....			36.4	34.9	32.4	29.8	27.2	24.7			45.1	0.1020	$\pm 0.10$
Triphenylarsine.....	40.1	39.1	38.1	36.8	34.5	32.2	30.0	27.7	25.4	23.1	45.9	0.0913	$\pm 0.30$
Triphenylstibine.....	39.1	38.2	37.4	36.0	33.9	31.7	29.5	27.3	25.1	22.9	44.8	0.0875	$\pm 0.10$

TABLE 69.4. Biphenyl [83]

(Capillary Rise Method-A)

Surface tension ( $\pm 0.40$ )								Least squares constants	
80°	90°	100°	120°	140°	160°	180°	200 °C	a	b
34.07	33.14	32.21	30.35	28.49	26.63	24.77	22.91	41.52	0.09307

TABLE 70. Phenol and nitro derivatives

(Maximum Bubble Pressure-A)

Compound	Surface tension									Least squares constants		$\sigma_{\gamma}$
	40°	50°	60°	80°	100°	120°	140°	160°	180 °C	a	b	
Phenol <sup>a</sup> .....	39.27	38.20	37.13	35.00	32.86	30.72	28.59			43.54	0.1068	$\pm 0.05$
<i>o</i> -Nitrophenol <sup>b</sup> .....		41.48	40.31	37.96	35.61	33.26	30.91	28.57	26.22	47.35	0.1174	$\pm 0.30$
<i>m</i> -Nitrophenol <sup>b</sup> .....					42.88	41.55	40.21	38.88	37.54	49.56	9.06675	$\pm 0.20$
<i>p</i> -Nitrophenol <sup>b</sup> .....						45.95	44.31	42.68	41.05	55.74	0.08161	$\pm 0.25$
2,4-Dinitrophenol <sup>c</sup> .....							39.86	38.03	36.20	52.67	0.09151	$\pm 0.14$
<i>p</i> -Nitroanisole <sup>d</sup> .....			42.40	40.50	38.61	36.72	34.82	32.93	31.03	48.08	0.0947	$\pm 0.10$
<i>o</i> -Nitroanisole <sup>e</sup> .....	43.88	42.69	41.51	39.14	36.77	34.40	32.03	29.66	27.29	48.62	0.1185	$\pm 0.19$

<sup>a</sup> Ref. [8] (Capillary Rise Method) ( $\pm 0.1$ ).<sup>b</sup> Ref. [27] ( $\pm 0.5$ ).<sup>c</sup> Ref. [108] (N<sub>2</sub>) ( $\pm 2.0$ ).<sup>d</sup> Ref. [200] ( $\pm 1.0$ ).<sup>e</sup> Ref. [28] ( $\pm 0.1$ ).

TABLE 71. Polymethylene dicyanides [81]  
 (Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	a	b	
Glutaronitrile.....	48.11	46.02	43.95	41.33	50.20	0.1044	$\pm 0.01$
Adiponitrile.....	45.93	43.99	42.04	39.61	47.88	0.0973	$\pm 0.01$
Pimelonitrile.....	44.75	42.70	40.66	38.10	46.80	0.1024	$\pm 0.01$
Suberonitrile.....	43.81	41.80	39.78	37.26	45.83	0.1008	$\pm 0.01$
Azelaonitrile.....	42.83	40.78	38.73	36.17	44.88	0.1025	$\pm 0.02$

 TABLE 72. Polymethylene dihalides [81]  
 (Maximum Bubble Pressure-A)

Dichlorides	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	a	b	
Dichloromethane <sup>a</sup> .....	27.84	25.27	-----	-----	30.41	0.1284	$\pm 0.05$
1,1-Dichloroethane <sup>a</sup> .....	24.66	22.29	-----	-----	27.03	0.1186	$\pm 0.05$
1,2-Dichloroethane <sup>b</sup> .....	32.57	29.72	26.86	23.29	35.43	0.1428	$\pm 0.02$
1,2-Dichloropropane <sup>b</sup> .....	28.94	26.46	23.98	20.88	31.42	0.1240	$\pm 0.02$
1,3-Dichloropropane.....	33.93	31.47	29.00	25.92	36.40	0.1233	$\pm 0.01$
1,4-Dichlorobutane.....	35.42	33.07	30.73	27.77	37.79	0.1174	$\pm 0.01$
1,5-Dichloropentane.....	35.75	33.44	31.14	28.25	38.06	0.1154	$\pm 0.04$
1,6-Dichlorohexane.....	35.99	33.68	31.34	28.43	38.32	0.1163	$\pm 0.02$
1,7-Dichloroheptane.....	36.03	33.85	31.67	28.92	38.22	0.1094	$\pm 0.02$
1,8-Dichloro-octane.....	36.11	34.00	31.90	29.26	38.22	0.1055	$\pm 0.01$
1,9-Dichlorononane.....	36.51	34.46	32.41	29.86	38.56	0.1025	$\pm 0.01$

Dibromides	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	a	b	
Dibromomethane <sup>a</sup> .....	39.79	36.82	33.84 <sup>±</sup>	30.12	42.77	0.1488	$\pm 0.10$
1,1-Dibromoethane <sup>a</sup> .....	33.68	31.08	28.49	25.24	36.28	0.1299	$\pm 0.02$
1,2-Dibromoethane.....	40.21	37.57	34.93	31.63	42.85	0.1320	$\pm 0.04$
1,2-Dibromopropane <sup>b</sup> .....	34.50	32.19	29.88	26.99	36.81	0.1155	$\pm 0.02$
1,3-Dibromopropane.....	39.93	37.53	35.13	32.13	42.33	0.1200	$\pm 0.01$
1,4-Dibromobutane.....	40.86	38.48	36.10	33.12	43.24	0.1190	$\pm 0.01$
1,5-Dibromopentane.....	40.56	38.30	36.02	33.20	42.83	0.1133	$\pm 0.00$
1,6-Dibromohexane.....	40.33	38.13	35.92	33.16	42.53	0.1102	$\pm 0.01$
1,7-Dibromoheptane.....	40.28	38.11	35.96	33.26	42.44	0.1080	$\pm 0.00$
1,8-Dibromo-octane.....	39.84	37.74	35.63	33.00	41.95	0.1053	$\pm 0.00$
1,9-Dibromononane.....	39.55	37.49	35.44	32.87	41.60	0.1027	$\pm 0.01$

TABLE 72. Polymethylene dihalides [81]—Continued  
(Maximum Bubble Pressure-A)

Diiodides	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Diiodomethane.....	66.98	63.76	60.53	56.50	70.21	0.1613	$\pm 0.02$
1,3-Diiodopropane.....	47.87	45.49	43.09	40.10	50.26	0.1195	$\pm 0.01$
1,4-Diiodobutane.....	47.08	44.79	42.49	39.63	49.37	0.1146	$\pm 0.01$
1,5-Diiodopentane.....	45.54	43.35	41.17	38.44	47.72	0.1092	$\pm 0.02$
1,6-Diiodohexane.....	44.49	42.19	39.89	37.00	46.80	0.1153	$\pm 0.01$
1,7-Diiodoheptane.....	43.93	41.74	39.55	36.81	46.12	0.1095	$\pm 0.01$
1,8-Diiodooctane.....	43.25	41.17	39.09	36.49	45.33	0.1040	$\pm 0.01$
1,9-Diiodononane.....	42.51	40.53	38.54	36.06	44.50	0.0993	$\pm 0.02$

<sup>a</sup> Ref. [250].<sup>b</sup> Ref. [244] ( $\pm 0.1$ ).

TABLE 73.1. Heterocyclic nitrogen containing compounds

Compound	Surface tension										Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	50°	60°	70°	80°	90°	100 °C	a	b	
Pyrrole <sup>a</sup> .....	38.71	37.61	36.51	35.41	34.31	33.21	21.11				39.81	0.1100	$\pm 0.08$
Pyrrolidine <sup>a</sup> .....	30.58	29.65	28.80	27.88	26.98	26.08	25.18				31.48	0.0900	$\pm 0.08$
Pyrimidine <sup>b</sup> .....		30.83	29.82	28.81	27.80	26.79	25.78	24.77	23.76	22.75	32.85	0.1010	$\pm 0.10$
Pyridazine <sup>c</sup> .....	49.51	48.48	47.44	46.41	45.37	44.33	43.30	42.26	41.23	40.19	50.55	0.1036	$\pm 0.12$
Quinoline <sup>d</sup> .....	44.19	43.12	42.06	41.00	39.93	38.87	37.81	36.75	35.68	34.62	45.25	0.1063	$\pm 0.15$
Piperidine <sup>e</sup> .....	30.64	29.48	28.33	27.18	26.02	24.87	23.72	22.57	21.41	20.26	31.79	0.1153	$\pm 0.10$

<sup>a</sup> Ref. [90] (Maximum Bubble Pressure-N<sub>2</sub>) ( $\pm 0.15$ ).<sup>d</sup> Ref. [179] (Capillary Rise Method-A) ( $\pm 0.3$ ).<sup>b</sup> Ref. [104] (Maximum Bubble Pressure-A) ( $\pm 0.15$ ).<sup>e</sup> Ref. [177] (Capillary Rise Method-A) ( $\pm 0.2$ ).<sup>c</sup> Ref. [103] (Capillary Rise Method-A) ( $\pm 0.1$ ).TABLE 73.2. Pyridinealdehydes and pyridinemethanols [126]  
(Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_{\gamma}$
	20°	40°	60°	85 °C	a	b	
Picolinaldehyde.....	41.53	39.22	36.94	34.07	43.82	0.1147	$\pm 0.00$
Nicotinaldehyde.....	46.54	44.02	41.49	38.34	49.06	0.1261	$\pm 0.03$
Isonicotinaldehyde.....	48.66	46.06	43.47	40.22	51.26	0.1299	$\pm 0.04$
2-Pyridinemethanol.....	47.28	45.04	42.81	40.01	49.52	0.1119	$\pm 0.02$
3-Pyridinemethanol.....	49.73	47.40	45.06	42.14	52.07	0.1168	$\pm 0.04$

TABLE 74. Rhenium oxychlorides [23]  
 (Diff. Cap. Rise-A)

Compound	Surface tension ( $\pm 0.1$ )						Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	50°	60 °C	a	b	
Rhenium dioxytrichloride.....				47.06	44.57	42.01	57.00	0.2485	$\pm 0.54$
Rhenium trioxymonochloride.....	52.06	50.08	48.10	46.12			54.04	0.1979	$\pm 0.33$

 TABLE 75. Organosilicon compounds I [149]  
 (Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )					Least squares constants		$\sigma_{\gamma}$
	25°	30°	35°	40°	45 °C	a	b	
Trimethylphenylsilane.....	24.29	23.89	23.49	23.11	22.72	26.25	0.0785	$\pm 0.05$
Dimethyldiphenylsilane.....	32.47	32.03	31.59	31.15	30.71	34.67	0.0880	$\pm 0.05$
Bromotrimethylsilane.....	19.85	19.32	18.78	18.25	17.71	22.53	0.1070	$\pm 0.06$
Bromodimethylphenylsilane.....	28.30	27.95	27.59	27.24	26.88	30.08	0.0710	$\pm 0.11$
Dibromodimethylsilane.....	24.57	24.12	23.67	23.22	22.77	26.83	0.0903	$\pm 0.03$
Bromodiethylmethylsilane.....	23.55	23.13	22.71	22.29	21.87	25.65	0.0840	$\pm 0.06$

 Organosilicon compounds II [148]  
 (Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )						Least squares constants		$\sigma_{\gamma}$
	15°	20°	25°	30°	35°	40 °C	a	b	
Tetraethyl silicate.....	22.34	21.67	21.18	20.69			23.63	0.09787	$\pm 0.10$
Tetrapropyl silicate.....	24.01	23.58	23.14	22.71			25.31	0.08673	$\pm 0.12$
Hexamethyldisiloxane.....	15.86	15.48	15.10	14.72			17.01	0.07634	$\pm 0.09$
Octamethylcyclotetrasiloxane.....	18.97	18.57	18.16	17.76			20.19	0.08105	$\pm 0.13$
Decamethylcyclopentasiloxane.....	18.71	18.43	18.15	17.87			19.56	0.05647	$\pm 0.10$
Tetramethylsilane.....		12.85							$\pm 0.07$
Tetraethylsilane.....	23.60	23.06	22.52	21.98	21.44	20.91	25.22	0.10786	$\pm 0.04$
Chlorotrimethylsilane.....		17.76	17.32	16.88	16.45	16.01	19.51	0.0875	$\pm 0.10$

TABLE 75. Organosilicon compounds III [144]—Continued

Organosilicon compounds III [144]

(Differential Capillary Rise-A)

Compound	Surface tension ( $\pm 0.10$ )				Least squares constants		$\sigma_{\gamma}$
	10°	15°	20°	25 °C	<i>a</i>	<i>b</i>	
Trichlorosilane.....	19.35	18.82	18.27	17.74	20.43	0.1076	$\pm 0.06$
Dichloroethylsilane.....	22.92	22.31	21.70	21.09	24.14	0.1220	$\pm 0.05$
Chlorodiethylsilane.....	23.36	22.83	22.30	21.77	24.42	0.1060	$\pm 0.05$
Triethylsilane.....	21.49	21.10	20.71	20.32	22.27	0.0780	$\pm 0.06$
Triethoxysilane.....	22.15	21.70	21.25	20.80	23.05	0.0900	$\pm 0.08$

TABLE 76. Substituted phenols and anisoles

Compound	Surface tension										Least squares constants		$\sigma_7$	
											a	b		
	25°	40°	60°	80°	100°	120°	130°	140°	150°	170°				180 °C
<i>o</i> -Chlorophenol <sup>a</sup>	39.7	38.0	35.8	33.5	31.3	29.0	27.9	26.8	25.7	23.4	---	42.5	0.1122	---
<i>m</i> -Chlorophenol <sup>c</sup>	---	39.7	37.6	35.6	33.6	31.6	30.6	29.6	28.6	26.6	25.5	43.7	0.1009	±0.11
<i>p</i> -Chlorophenol <sup>a</sup>	---	41.8	39.7	37.6	35.5	33.4	32.4	31.3	30.3	28.2	27.1	46.0	0.1049	---
<i>m</i> -Bromophenol <sup>c</sup>	---	41.9	40.0	38.1	36.2	34.3	33.3	32.4	31.4	29.5	28.5	45.69	0.09528	±0.04
<i>p</i> -Bromophenol <sup>c</sup>	---	---	40.3	38.2	36.0	34.2	33.2	32.8	32.8	30.7	29.5	48.88	0.1070	---
<i>o</i> -Chloranisole <sup>a</sup>	38.6	36.8	34.5	32.1	29.8	27.4	26.3	25.1	23.9	21.6	20.4	41.5	0.1171	---
<i>p</i> -Chloranisole <sup>a</sup>	46.3	44.7	42.6	40.4	38.3	36.1	35.1	34.0	32.9	30.8	29.7	49.0	0.1073	---
<i>o</i> -Cresol <sup>f</sup>	36.90	35.39	33.36	31.34	29.32	27.30	26.29	25.28	24.26	22.24	21.23	39.43	0.1011	±0.04
<i>m</i> -Cresol <sup>o</sup>	35.69	34.31	32.46	30.61	28.76	26.92	25.99	25.07	24.14	22.30	21.37	38.00	0.09237	±0.06
<i>p</i> -Cresol <sup>o</sup>	---	34.88	33.02	31.17	29.32	27.47	26.54	25.61	24.69	22.83	21.91	38.58	0.09262	±0.04
Pyrocatechol <sup>b</sup>	---	---	---	---	39.1	37.4	36.6	35.7	34.9	33.2	32.3	47.6	0.0849	---
Resorcinol <sup>b</sup>	---	---	---	---	47.6	46.2	45.5	44.8	44.0	42.6	41.9	54.8	0.0717	---
Guaiacol <sup>b</sup>	---	37.4	35.5	33.7	31.8	29.9	28.9	28.0	27.1	25.2	24.2	41.2	0.0943	---
<i>m</i> -Methoxyphenol <sup>b</sup>	42.2	41.0	39.3	37.7	36.1	34.5	33.7	32.8	32.0	30.4	29.6	44.2	0.0811	---
<i>p</i> -Methoxyphenol <sup>b</sup>	---	---	39.9	38.3	36.7	35.1	34.3	33.4	32.6	31.0	30.2	44.8	0.0811	---
Veratrol <sup>b</sup>	---	---	30.5	29.3	28.0	26.7	26.1	25.4	24.8	23.5	22.8	34.4	0.0642	---
<i>m</i> -Dimethoxybenzene <sup>b</sup>	32.8	31.8	31.3	29.8	28.2	26.7	26.0	25.2	24.5	23.0	22.2	35.8	0.0755	---
<i>p</i> -Dimethoxybenzene <sup>b</sup>	33.9	32.8	32.5	30.8	29.0	27.3	26.4	25.5	24.7	22.9	22.1	37.7	0.0868	---
2,4-Dichlorophenol <sup>d</sup>	---	41.71	39.26	36.82	34.38	31.94	30.72	29.50	28.27	25.83	24.61	46.59	0.1221	±0.01
2,4,5-Trichlorophenol <sup>d</sup>	---	---	41.35	39.11	36.87	34.63	33.51	32.39	31.27	29.03	27.91	48.07	0.1120	±0.02
2,4,6-Trichlorophenol <sup>e</sup>	---	---	---	35.49	34.53	33.58	31.67	29.75	28.80	26.89	25.93	43.13	0.09554	±0.37
4,4'-Azoxydianisole <sup>e</sup>	---	---	---	---	38.31	37.49	36.67	35.86	35.86	34.22	33.40	48.12	0.08175	±0.04

<sup>a</sup> Ref. [139] (Maximum Bubble Pressure-A) (±0.10).<sup>b</sup> Ref. [137] (Maximum Bubble Pressure-A) (±0.10).<sup>c</sup> Ref. [93] (Capillary Rise Method-A) (±0.4).<sup>d</sup> Ref. [8] (Capillary Rise Method) (±0.10).<sup>e</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) (±2.0).<sup>f</sup> Ref. [179] (Capillary Rise Method-V) (±0.3).<sup>g</sup> Ref. [183] (Capillary Rise Method-A) (±0.2).



TABLE 77.1. Benzylated phenol derivatives [54]

(Drop-weight Method-A)

Compound	Surface tension ( $\pm 0.10$ )					Least squares constants		$\sigma_\gamma$
	20°	30°	40°	50°	60 °C	<i>a</i>	<i>b</i>	
Benzyl <i>o</i> -chlorophenyl ether .....	42.16	41.14	40.13	39.12	38.11	44.18	0.1012	$\pm 0.03$
<i>o</i> -Chlorobenzyl phenyl ether .....	42.31	41.23	40.15	39.07	37.99	44.47	0.1080	$\pm 0.05$
2-Chloro- $\alpha$ -phenyl- <i>p</i> -cresol .....	44.20	43.19	42.17	41.16	40.15	46.23	0.1014	$\pm 0.04$
$\alpha$ -( <i>o</i> -Chlorophenyl)- <i>p</i> -cresol .....	43.63	42.89	42.15	41.40	40.66	45.12	0.0743	$\pm 0.07$
$\alpha$ -( <i>o</i> -Chlorophenyl)- <i>p</i> -cresol benzoate .....	42.88	42.24	41.61	40.98	40.35	44.14	0.0632	$\pm 0.06$
4,6-Dibenzyl- <i>o</i> -cresol .....	42.71	42.06	41.42	40.77	40.12	44.00	0.0646	$\pm 0.05$
2,6-Dibenzyl- <i>m</i> -cresol .....	39.57	39.09	38.61	38.12	37.64	40.53	0.0481	$\pm 0.05$
2,6-Dibenzyl- <i>p</i> -cresol .....	40.89	40.34	39.79	39.24	38.69	41.99	0.0550	$\pm 0.05$
6-Benzyl-2-phenylphenol .....	44.12	43.24	42.36	41.48	40.61	45.87	0.0877	$\pm 0.04$
4-Benzyl-2-phenylphenol .....	44.13	43.41	42.68	41.96	41.24	45.58	0.0724	$\pm 0.04$
6-Benzyl-4-bromo-2-phenylphenol .....		44.10	43.36	42.62	41.88	46.32	0.0740	$\pm 0.00$
4-Benzyl-6-bromo-2-phenylphenol .....		43.94	43.01	42.24	42.07	44.87	0.0466	$\pm 0.00$
<i>o</i> -Hydroxy-1,1-diphenylbutane .....	37.76	37.01	36.27	35.52	34.77	39.25	0.0746	$\pm 0.07$

TABLE 77.2 Higher phenols [106]  
 (Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.20$ )												Least squares constants		$\sigma_7$
	40°	45°	55°	65°	75°	85°	95°	100°	120°	140°	160 °C	a	b		
	3,4-Xylenol	31.10	30.66	29.79	28.92	28.06	28.01	27.10	26.65	24.83	23.01	21.19	35.75	0.0910	
2,4-Xylenol	---	---	---	28.92	28.06	27.19	26.32	25.88	24.15	22.41	20.67	34.57	0.08685	$\pm 0.21$	
3,5-Xylenol	---	---	---	---	28.04	27.23	26.43	26.02	24.41	22.80	21.18	34.09	0.08066	$\pm 0.07$	
2,5-Xylenol	---	---	---	---	---	29.49	28.64	28.22	26.52	24.82	23.12	36.72	0.0850	$\pm 0.19$	
Thymol	---	---	29.43	28.61	27.79	26.97	26.15	25.74	24.10	22.45	20.81	33.95	0.08212	$\pm 0.01$	
5,6,7,8-Tetrahydro-1-naphthol	---	---	---	---	38.42	37.38	36.34	35.82	33.75	31.68	30.60	46.19	0.10366	$\pm 0.24$	
5,6,7,8-Tetrahydro-2-naphthol	---	---	---	---	38.90	38.17	37.45	36.72	34.90	33.44	31.99	43.63	0.07276	$\pm 0.07$	
1,2,3,4-Tetrahydro-1-naphthol	40.20	39.77	38.91	38.06	37.20	36.34	---	---	---	---	---	43.63	0.08575	$\pm 0.22$	

 TABLE 77.3 Substituted phenols and phenolic ethers [28]  
 (Maximum Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.20$ )																	Least squares constants		$\sigma_7$
	50°	60°	70°	80°	90°	100°	115°	120°	130°	140°	150°	160°	170°	180°	190 °C	a	b			
	Methyl phenylazo-2-naphthyl ether	---	---	---	42.69	41.64	40.60	39.04	---	---	---	---	---	---	---	---	---	51.03	0.1043	
1,2-Naphthoquinone	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1-phenylhydrazine	42.11	41.06	40.02	38.97	37.93	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Methoxyazobenzene	41.25	40.12	38.98	37.84	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3-Methoxyazobenzene	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Methoxyazobenzene	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
m-Phenylazophenol	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Benzoquinone	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
phenylhydrazine	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
o-Anisaldehyde	39.81	38.71	37.60	36.50	35.39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
p-Phenylazophenol	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
p-Anisaldehyde*	39.45	38.41	37.36	36.31	35.27	34.22	32.65	32.13	31.08	30.03	28.98	27.94	26.89	25.84	24.80	44.69	0.1047	$\pm 0.29$		

\* Ref. [108] ( $N_2$ ) ( $\pm 2.0$ ).

TABLE 78. Chlorides of sulfur  
(Capillary Rise Method-A)

Compound	Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_{\gamma}$
	15°	25°	35°	45°	55°	65°	75°	85 °C	<i>a</i>	<i>b</i>	
Sulfur monochloride <sup>a</sup> -----	44.03	42.57	41.11	39.64	38.18	36.71	35.25	33.79	46.23	0.1464	$\pm 0.11$
Thionyl chloride <sup>b</sup> -----	33.98	32.56	31.14	29.73	28.31	26.90	-----	-----	36.10	0.1416	$\pm 0.10$
Sulfuryl chloride <sup>b</sup> -----	30.11	28.78	27.45	26.12	-----	-----	-----	-----	32.10	0.1328	$\pm 0.21$

<sup>a</sup> Ref. [248].<sup>b</sup> Ref. [250].

TABLE 79. Sulfur dioxide addition compounds  
(Capillary Rise Method-V)

Compound	Surface tension ( $\pm 0.07$ )									Least squares constants	
	0°	5°	10°	15°	20°	25°	30°	35°	40 °C	<i>a</i>	<i>b</i>
Triethylamine-sulfur dioxide <sup>a</sup> -----	38.24	37.55	36.86	36.18	35.49	34.80	34.11	-----	-----	38.24	0.1376
Tripropylamine-sulfur dioxide <sup>b</sup> -----	33.25	32.65	31.91	31.30	30.59	29.95	29.25	28.64	28.03	33.25	0.1317
<i>N,N</i> -Dimethylaniline-sulfur dioxide <sup>c</sup> -----	43.87	42.97	42.02	41.26	40.23	39.37	38.49	-----	-----	43.87	0.1799

<sup>a</sup> Ref. [21].<sup>b</sup> Ref. [110].<sup>c</sup> Ref. [20].

TABLE 80.1. Tertiary chlorides [204, 172]  
 (Maximum Bubble Pressure-A)

Chloromethane	Surface tension ( $\pm 0.10$ )							Least squares constants	
	0°	25°	35°	45°	55°	65°	75 °C	a	b
2-Chloro-2-methylpropane	21.35	18.30							
2-Chloro-2-methylbutane	25.11	21.81	20.49	19.17	17.85			25.11	0.1320
3-Chloro-3-methylpentane	26.52	23.65	22.50	21.35	20.21			26.52	0.1148
3-Chloro-3-ethylpentane	27.88	25.35	24.34	23.33	22.31			27.88	0.1012
3-Chloro-3-ethylhexane	28.08	25.50	24.47	23.44	22.41			28.08	0.1030
4-Chloro-4-ethylheptane	28.20	25.82	24.86	23.91	22.95			28.20	0.0954
4-Chloro-4-propylheptane	28.28	25.93	25.00	24.06	23.12	22.18	21.25	28.28	0.0938
2-Chloro-2-methylpentane	24.98	22.41	21.38	20.35	19.32	18.29	17.26	24.98	0.1029
4-Chloro-4-methylheptane	27.09	24.75	23.81	22.88	21.94			27.09	0.0936
3-Chloro-3-methylhexane	26.92	24.37	23.35	22.33	21.31			26.92	0.1020
2-Chloro-2-methylhexane	26.10	23.66	22.68	21.70	20.72	19.74	18.77	26.10	0.0978
3-Chloro-3-methylheptane	24.11	23.38	23.08	22.79	22.50			24.11	0.0293
4-Chloro-4-methyloctane	28.41	25.98	25.00	24.03	23.05			28.41	0.0973
5-Chloro-5-methylnonane	28.51	26.24	25.32	24.41	23.50			28.51	0.09113
2-Chloro-2-methylheptane	26.86	24.50	23.56	22.61	21.67			26.86	0.09442
3-Chloro-3-methyloctane	28.77	26.17	25.13	24.09	23.05			28.77	0.1040
4-Chloro-4-methylnonane	28.85	26.52	25.58	24.66	23.72			28.85	0.0933
5-Chloro-5-methyldecane	29.29	27.16	26.31	25.46	24.61			29.29	0.0851
5-Chloro-5-propyldecane	29.26	26.99	26.09	25.18	24.27			29.26	0.0907
5-Chloro-5-butyldecane	29.80	27.43	26.49	25.54	24.59			29.80	0.0947
2-Chloro-2-methyloctane	27.75	25.37	24.42	23.47	22.51	21.56	20.61	27.75	0.0952
3-Chloro-3-methylnonane	28.70	26.36	25.42	24.49	23.55	22.62	21.68	28.70	0.0936
4-Chloro-4-methyldecane	28.75	26.48	25.58	24.67	23.77	22.86	21.96	28.75	0.0906
5-Chloro-5-methylundecane	29.30	27.05	26.15	25.25	24.35	23.45	22.55	29.30	0.0900
6-Chloro-6-methyldodecane	29.18	27.03	26.18	25.32	24.46	23.60	22.74	29.18	0.0858

 TABLE 80.2. Ditertiary chlorides [120]  
 (Max. Bubble Pressure-A)

Compound	Surface tension ( $\pm 0.20$ )						Least squares constants	
	25°	35°	45°	55°	65°	75 °C	a	b
2,5-Dichloro-2,5-dimethylhexane					24.67	23.59		
3,6-Dichloro-3,6-diethyloctane	31.33	30.40	29.48	28.55			33.65	0.09275
4,7-Dichloro-4,7-dipropyldecane	29.86	28.96	28.07	27.17			32.11	0.08986
2,7-Dichloro-2,7-dimethyloctane				26.43	25.62	24.81	30.89	0.0810
3,8-Dichloro-3,8-diethyldecane	32.16	31.22	30.28	29.35			34.51	0.0939
4,9-Dichloro-4,9-dipropyldodecane	30.71	29.81	28.91	28.03			32.96	0.0899
2,10-Dichloro-2,10-dimethylundecane	30.33	29.44	28.54	27.64			32.57	0.08955
3,11-Dichloro-3,11-diethyltridecane	32.61	31.73	30.86	29.99			34.79	0.08729
2,11-Dichloro-2,11-dimethyldodecane	30.75	29.87	28.99	28.11			32.96	0.0882
3,12-Dichloro-3,12-diethyltetradecane	32.89	32.01	31.12	30.23			35.11	0.08869
4,13-Dichloro-4,13-dipropylohexadecane	31.53	30.68	29.82	28.96			33.67	0.08557

TABLE 81. Terpenes

Compound	Surface tension												Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	60°	80°	100°	120°	130°	140°	150 °C	<i>a</i>	<i>b</i>		
<i>d</i> -Pinene <sup>a</sup> .....	27.41	26.46	25.52	24.57	22.68	20.79	18.91	17.02	16.07	15.13	-----	28.35	0.09444	±0.04	
<i>l</i> -Pinene <sup>a</sup> .....	27.33	26.39	25.46	24.52	22.65	20.79	18.92	17.05	16.11	15.18	-----	28.26	0.09343	±0.06	
<i>dl</i> -Pinene <sup>a</sup> .....	27.03	26.10	25.16	24.23	22.37	20.50	18.64	16.78	15.84	14.91	-----	27.96	0.0932	±0.07	
<i>d-p</i> -Mentha-1,8-diene <sup>a</sup> .....	28.57	27.64	26.71	25.78	23.93	22.07	20.21	18.35	17.42	16.49	15.56	29.50	0.0929	±0.06	
<i>l-p</i> -Mentha-1,8-diene <sup>a</sup> .....	28.05	27.16	26.26	25.36	23.57	21.77	19.98	18.19	17.29	16.39	15.50	28.95	0.08969	±0.06	
<i>DL-p</i> -Mentha-1,8-diene <sup>a</sup> .....	28.20	27.28	26.37	25.46	23.63	21.81	19.98	18.15	17.24	16.33	15.41	29.11	0.09131	±0.05	
<i>m</i> -Mentha-1,8-(9)-diene <sup>b</sup> .....	27.87	26.90	25.94	24.98	23.05	21.13	19.20	17.27	16.31	15.35	14.38	28.83	0.09631	±0.20	
2(10)-Pinene <sup>b</sup> .....	28.17	27.27	26.37	25.47	23.67	21.87	20.07	18.27	17.37	16.47	15.57	29.07	0.09001	±0.14	
Linalool <sup>c</sup> .....	27.42	26.62	25.81	25.00	23.39	21.77	20.16	18.55	17.74	16.93	16.12	28.23	0.0807	±0.09	
<i>p</i> -Mentha-6,8-dien-2-one <sup>d</sup> .....	35.62	34.70	33.78	32.86	31.02	29.18	27.34	25.50	24.57	23.65	22.73	36.54	0.09204	-----	

<sup>a</sup> Ref. [151] (Capillary Rise Method-A).<sup>b</sup> Ref. [108] (Maximum Bubble Pressure-N<sub>2</sub>) (±2.0).<sup>c</sup> Ref. [179] (Capillary Rise Method-A) (±0.3).<sup>d</sup> Ref. [192] (Capillary Rise Method-A) (±0.7).

TABLE 82. Thiocyanates

(Capillary Rise Method)

Compound	Surface tension													Least squares constants		$\sigma_{\gamma}$
	10°	20°	30°	40°	50°	60°	80°	100°	120°	140°	160°	180 °C	<i>a</i>	<i>b</i>		
Methyl thiocyanate <sup>a</sup> .....	39.35	38.05	36.74	35.44	34.13	32.83	30.22	27.61	25.00	-----	-----	-----	40.66	0.1305	±0.7	
Ethyl thiocyanate <sup>b</sup> .....	36.05	34.83	33.60	32.38	31.15	29.92	27.47	25.02	22.57	20.12	-----	-----	37.28	0.1226	-----	
Ethyl isothiocyanate <sup>b</sup> .....	37.36	36.04	34.71	33.39	32.06	30.73	28.08	-----	-----	-----	-----	-----	38.69	0.1326	-----	
Propyl thiocyanate <sup>c</sup> .....	33.78	32.74	31.70	30.66	29.61	28.57	26.49	24.41	22.33	-----	-----	-----	34.82	0.1041	±0.10	
Butyl thiocyanate <sup>c</sup> .....	32.94	31.98	31.03	30.07	29.12	28.16	26.25	24.35	22.44	-----	-----	-----	33.89	0.09544	±0.04	
Butyl isothiocyanate <sup>d</sup> .....	31.43	30.42	29.42	28.42	27.41	26.41	24.41	22.40	20.39	-----	-----	-----	32.43	0.1003	±0.04	
Allyl isothiocyanate <sup>a</sup> .....	35.69	34.61	33.54	32.46	31.39	30.32	28.17	26.02	23.87	21.72	-----	-----	36.76	0.1074	±0.03	
Triisopentylammonium thiocyanate <sup>e</sup> .....	-----	-----	-----	-----	-----	30.28	29.40	28.52	27.64	-----	-----	-----	33.81	0.0441	±0.02	
Phenyl isothiocyanate <sup>d</sup> .....	41.64	40.56	39.47	38.39	37.30	36.21	34.04	31.87	29.70	27.53	25.35	23.18	42.73	0.1086	±0.16	

<sup>a</sup> Ref. [192] (A) (±0.7).<sup>b</sup> Ref. [177] (V) (±1.0).<sup>c</sup> Ref. [250] (A) (±0.10).<sup>d</sup> Ref. [16] (A) (±0.30).<sup>e</sup> Ref. [257] (A) (±0.30).

TABLE 83.1. Thiophene [116]  
(Maximum Bubble Pressure Method-A)

Compound	Surface tension ( $\pm 0.15$ )				Least squares constants	
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>
Thiophene.....	31.34	28.69	26.03	-----	34.00	0.1328

TABLE 83.2. Alkylthiophenes [116]

Alkylthiophenes	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
2-Methyl.....	30.83	28.27	25.71	22.51	33.39	0.1280	$\pm 0.15$
2-Ethyl.....	29.86	27.81	25.75	23.19	31.92	0.1028	$\pm 0.25$
2-Propyl.....	29.68	27.66	25.63	23.10	31.71	0.1013	$\pm 0.01$
2-Butyl.....	29.75	27.94	26.14	23.88	31.55	0.0902	$\pm 0.01$
2-Pentyl.....	30.09	28.18	26.27	23.88	32.00	0.0955	$\pm 0.11$
2-Hexyl.....	30.08	28.21	26.35	24.02	31.94	0.0932	$\pm 0.14$
2-Heptyl.....	30.40	28.54	26.68	24.36	32.26	0.0930	$\pm 0.01$
3-Methyl.....	32.33	29.91	27.50	24.47	34.75	0.1209	$\pm 0.04$
2,5-Dimethyl.....	30.45	28.28	26.12	23.41	32.62	0.1084	$\pm 0.12$

TABLE 83.3. 2-Thiophenecarboxylates [116]

Ester	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl.....	39.33	36.90	34.50	31.47	41.75	0.1209	$\pm 0.32$
Ethyl.....	36.97	34.63	32.28	29.35	39.32	0.1173	$\pm 0.18$
Propyl.....	34.06	32.22	30.38	28.08	35.90	0.0920	$\pm 0.26$
Butyl.....	33.12	30.92	28.72	-----	35.32	0.1100	$\pm 0.01$
Pentyl.....	32.52	30.81	29.11	26.98	34.22	0.0852	$\pm 0.08$
Hexyl.....	32.55	30.08	27.60	-----	35.03	0.1238	$\pm 0.04$
Heptyl.....	31.72	30.00	28.26	26.08	33.47	0.0869	$\pm 0.06$

TABLE 83.4. Alkyl-2-thienyl ketones [116]

2-Thienyl ketone	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
Methyl-.....	42.70	39.69	36.67	32.90	35.72	0.1508	$\pm 0.03$
Ethyl-.....	39.55	37.13	34.71	31.68	41.97	0.1210	$\pm 0.40$
Propyl-.....	36.78	35.17	33.55	31.53	38.40	0.08086	$\pm 0.49$
Isopropyl-.....	37.09	35.26	33.43	31.14	38.92	0.0915	$\pm 0.02$
Butyl-.....	35.65	33.92	32.19	30.02	37.38	0.0866	$\pm 0.02$
Pentyl-.....	34.83	33.08	31.34	29.15	36.58	0.0874	$\pm 0.11$
Hexyl-.....	34.36	32.70	31.03	28.96	36.02	0.0831	$\pm 0.17$

TABLE 83.5. Halogenathiophenes [116]

Thiophene	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
2-Chloro-.....	33.91	31.75	29.58	26.87	36.08	0.1083	$\pm 0.14$
2-Bromo-.....	37.44	35.31	33.19	30.53	39.57	0.1064	$\pm 0.05$
2-Iodo-.....	42.62	40.45	38.27	35.55	44.80	0.1088	$\pm 0.06$
2,5-Dichloro-.....	37.94	35.49	33.04	29.98	40.39	0.1225	$\pm 0.18$
2,5-Dibromo-.....	43.51	41.34	39.18	36.47	45.67	0.1082	$\pm 0.02$

TABLE 83.6. Miscellaneous thiophene compounds [116]

Compounds	Surface tension ( $\pm 0.15$ )				Least squares constants		$\sigma_\gamma$
	20°	40°	60°	85 °C	<i>a</i>	<i>b</i>	
2-Thiopheneethanol.....	40.30	37.87	35.43	32.39	42.73	0.1216	$\pm 0.10$
2-Thiophenepropanol.....	36.77	34.89	33.01	30.66	38.65	0.0940	$\pm 0.06$
2-Thiophenebutanol.....	36.27	34.13	32.00	29.32	38.41	0.1069	$\pm 0.06$
2-Thiophenecarbonitrile.....	46.44	43.72	40.99	37.58	49.17	0.1363	$\pm 0.02$
2-Methoxythiophene.....	36.53	34.16	31.78	28.81	38.91	0.1188	$\pm 0.20$
2-Ethoxythiophene.....	33.74	31.69	29.64	27.08	35.79	0.1025	$\pm 0.09$
2-Thiophenecarboxaldehyde.....	49.13	46.50	43.87	41.76	51.76	0.1315	$\pm 0.18$
Tetrahydrothiophene.....	35.76	33.07	30.39	27.03	38.44	0.1342	$\pm 0.10$
Tetrahydrothiophene oxide.....	49.49	47.01	44.53	41.43	51.97	0.1240	$\pm 0.29$
Tetrahydrothiophene dioxide.....	49.35	43.25	35.62	31.55	61.55	0.0305	$\pm 0.10$
Tetrahydrothiopyran.....	36.11	33.66	31.20	28.57	38.57	0.1228	$\pm 0.06$
1,4-Oxathiane.....	42.42	39.92	37.41	34.28	44.93	0.1253	$\pm 0.06$

TABLE 84. Titanium tetrachloride [170]

(Capillary Rise Method-V)

$$(\gamma = 36.06 - 0.12705t + 0.574 \times 10^{-4}t^2 + 0.146 \times 10^{-6}t^3)$$

Surface tension ( $\pm 0.2$ )									
0°	10°	20°	30°	40°	50°	60°	70°	80°	90 °C
36.06	34.80	33.54	32.30	31.06	29.87	28.68	27.50	26.34	25.20

TABLE 85. Vanadium oxytrichloride [170]

(Maximum Bubble Pressure Method)

$$(\gamma = 39.32 - 0.1531t + 0.284 \times 10^{-3}t - 0.742 \times 10^{-6}t^3)$$

Surface tension ( $\pm 0.2$ )									
0°	10°	20°	30°	40°	50°	60°	70°	80°	90 °C
39.32	37.82	36.36	34.97	33.60	32.28	30.99	29.74	28.51	27.30

TABLE 86. Water

Surface tension ( $\pm 0.10$ )														Least squares constants		$\sigma_\gamma$
10°	15°	20°	25°	30°	35°	40°	45°	50°	60°	70°	80°	90°	100 °C	a	b	
74.36	73.62	72.88	72.14	71.40	70.66	69.92	69.18	68.45	66.97	65.49	64.01	62.54	61.06	75.83	0.1477	$\pm 0.08$

Ref. [33] (Capillary rise-He).  
 Ref. [72aa] (Capillary rise-N<sub>2</sub>).  
 Ref. [155] (Capillary Rise-A).

Ref. [181] (Capillary rise-A).  
 Ref. [224] (Capillary rise-A).  
 Ref. [264] (Capillary rise-A).



**SURFACE TENSION OF LIQUIDS**

TABLE 86. Water—Continued  
Heavy water [36]  
(Horizontal Capillary Pressure-A)

Surface tension ( $\pm 0.18$ ) ( $\gamma = 74.64 - 0.1082t^{1.1}$ )														
5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75 °C
74.00	73.28	72.52	71.72	70.91	70.08	69.24	68.38	67.51	66.64	65.75	64.86	63.96	63.05	62.14

Deuterium oxide [89]  
(at elevated temperatures)  
(Capillary Rise Method-V)

Surface tension ( $\pm 0.10$ )								Least squares constants		$\sigma_\gamma$
100°	110°	120°	140°	160°	180°	200°	215 °C	a	b	
58.61	56.41	54.21	49.81	45.40	41.00	36.60	33.30	80.62	0.2201	$\pm 0.24$

Hydrogen peroxide [140]  
(Capillary Rise Method-A)

Surface tension ( $\pm 0.50$ )								Least squares constants		$\sigma_\gamma$
2°	4°	6°	8°	10°	12°	15°	20 °C	a	b	
78.66	78.35	78.04	77.73	77.42	77.11	76.65	75.87	78.97	0.1549	$\pm 0.22$

## 3.1. Tables of Surface Tension at Single Temperatures

TABLE 87.1. Polysiloxanes (25 °C) [107]

(Method not given)	
Octamethyltrisiloxane.....	67.56
Decamethyltetrasiloxane.....	86.20
Dodecamethylpentasiloxane.....	17.08
Tetradecamethylhexasiloxane.....	17.42
Hexadecamethylheptasiloxane.....	17.61
Octadecamethyloctasiloxane.....	18.03

TABLE 87.2. Linear polymethylsiloxanes (20 °C) [64]

(Ring Detachment-A)	
Heptadecamer.....	19.9
Dodecamer.....	19.6
Nonamer.....	19.2
Heptamer.....	18.6
Hexamer.....	18.5
Pentamer.....	18.1
Tetramer.....	17.6
Trimer.....	17.0

TABLE 87.3. Chloromethylsilanes (20 °C) [180]

(Cap. Rise-V)	
Trichloromethylsilane.....	20.3
Dichlorodimethylsilane.....	20.1
Trimethylsilanol.....	18.4

TABLE 87.4. Esters (20 °C) [64, 194]

(Ring Detachment-A)	
Tricresyl phosphate.....	40.9
Benzyl phenylundecanoate.....	37.7
Di(2-ethylhexyl) phthalate.....	31.2
Di(2-ethylhexyl) sebacate.....	31.1
Pentaerythritol tetracaproate.....	30.4
1,6-Hexamethylene glycol di-2-ethylhexanoate.....	30.2
Di(2-ethylhexyl) adipate.....	30.2
Tri(2-ethylhexyl) tricarballylate.....	29.6
Butylphenylhendecanoate.....	38.0
Hexa(2-ethyl-1-hexoxy) disiloxane.....	26.8
Hexa(2-ethyl-1-butoxy) disiloxane.....	26.1

TABLE 87.5. Acetals and ethers (20 °C) [152]

(Max. Bubble Pressure-A)	
1,1-Diisopropoxyethane.....	20.97
1,1-Dipentyloxyethane.....	25.67
1,1-Diisopentyloxyethane.....	23.98
1,1-Di(2-chloroethoxy)ethane.....	36.22
1,1-Di(2-ethoxyethoxy)ethane.....	27.44
1-Butoxy-1-ethoxyethane.....	23.26
1-Butoxy-1-tert-butoxyethane.....	22.65
sec-Butyl vinyl ether.....	20.76
Pentyl vinyl ether.....	23.44
Octyl vinyl ether.....	26.32

TABLE 87.6. Alkyl glycolates (20 °C) [52]

(Method not given)	
Propyl glycolate.....	31.55
Butyl glycolate.....	30.43
Hexyl glycolate.....	29.66
Heptyl glycolate.....	29.40

TABLE 87.7. Alkyl glycol monoethers (20 °C) [42]

(Cap. Rise-A)	
2-Pentyloxyethanol.....	27.6
2-(2-Pentyloxyethoxy)ethanol.....	29.9
2-Hexyloxyethanol.....	27.7
2-(2-Hexyloxyethoxy)ethanol.....	29.6
1-(2-Hexyloxyethoxy)-2-(2-hydroxyethoxy)ethane.....	31.0
Tetraethylene glycol monoethyl ether.....	32.1
2-Octyloxyethanol.....	29.8
2-(2-Octyloxyethoxy)ethanol.....	30.7
1-(2-Hydroxyethoxy)-2-(2-octyloxyethoxy)ethane.....	31.5
Tetraethylene glycol mono-octyl ether.....	32.0
Pentaethylene glycol mono-octyl ether.....	32.17
Hexaethylene glycol mono-octyl ether.....	32.85
2-Dodecyloxyethanol.....	29.6
2-(2-Dodecyloxyethoxy)ethanol.....	30.6
1-(2-Dodecyloxyethoxy)-2-(2-hydroxyethoxy)ethane.....	31.3
Tetraethylene glycol mono-dodecyl ether.....	31.7
Pentaethylene glycol mono-dodecyl ether.....	32.0

TABLE 87.8. Alkyl derivatives of benzene and styrene (20 °C) [325]

(Max. Bubble Pressure-A)	
Isopentylbenzene.....	28.34
tert-Pentylbenzene.....	29.02
p-Cymene.....	29.44
p-Di-sec-butylbenzene.....	29.98
$\beta$ -Methylstyrene.....	34.12
Styrene.....	32.00
Allylbenzene.....	30.37
$\alpha$ -Methylstyrene.....	32.56
$\beta$ -Ethylstyrene.....	32.01
1-Phenyl-2-butene.....	30.48
2-Phenyl-2-butene.....	33.61
(2-Methylpropenyl)benzene.....	31.86
$\beta$ -Propylstyrene.....	33.23
$\beta$ -Isopropylstyrene.....	31.40
$\beta$ -Ethyl- $\beta$ -methylstyrene.....	31.80
$\alpha, \beta, \beta$ -Trimethylstyrene.....	32.04
$\beta$ -Ethyl- $\alpha$ -methylstyrene.....	32.25
$\alpha$ -Ethyl- $\beta$ -methylstyrene.....	33.87
$\beta, \beta$ -Diethylstyrene.....	32.22
$\beta$ -Isobutyl- $\alpha$ -methylstyrene.....	31.38
$\beta$ -Ethyl- $\alpha$ -propylstyrene.....	34.20
cis- $\beta$ -Vinylstyrene.....	36.15
trans- $\beta$ -Vinylstyrene.....	36.21
Isopropyl-1-pentylstyrene.....	36.59

TABLE 87.9. Nonaromatic cyclic compounds (20 °C) [152]

(Method not given)	
2-Methoxycyclopentanol	38.1
2-Ethoxycyclopentanol	35.0
2-Methoxycyclohexanol	37.7
2-Ethoxycyclohexanol	34.7
2-Propoxycyclohexanol	34.7
2-Methoxy-1-methylcyclohexanol	36.4
1-Ethyl-2-methoxycyclohexanol	36.1
1,2-Dimethoxycyclopentane	31.9
1,2-Diethoxycyclopentane	31.9
1,2-Dimethoxycyclohexane	34.2
1,2-Diethoxycyclohexane	33.9
1,2-Dipropoxycyclohexane	33.5
1,2-Diisopropoxycyclohexane	33.4
1,2-Dibutoxycyclohexane	33.1
1,2-Dicyclohexyloxycyclohexane	36.5
Bicyclopentyl <sup>a</sup> (30 °C)	29.8

<sup>a</sup> Ref. [113a] (Horizontal Capillary-A).

TABLE 87.10. Halogenated hydrocarbons (non-fluoro) (20 °C) [194]

(Cap. Rise)	
Trichlorobiphenyl	45.3
Tetrachlorobiphenyl	44.2
Perchlorocyclopentadiene	37.5
Hexachloro-1,3-butadiene	36.0

TABLE 87.11. Fluorocarbons (25 °C) [88]

(Method not given)	
Perfluoro-1,2-dimethylcyclohexane	15.5
Perfluoro-1,3,5-trimethylcyclohexane	17.2
Perfluoro-1,2,4-trimethylcyclohexane	17.3
Perfluoro-octane	13.7
Perfluorododecane (113.5 °C)	10.6
Perfluoro-2-methyldecahydronaphthalene	19.2
Perfluoropropylcyclohexane	17.2
Perfluorobutylcyclohexane	17.7
Perfluoro-4-isopropyl-1-methylcyclohexane	17.5
Perfluorodecahydronaphthalene	18.3
Perfluorononane	14.4
Perfluorodecane (45 °C)	13.5
Perfluoroundecane (70 °C)	12.7
Perfluoro-1,4-dimethylcyclohexane <sup>a</sup> (20 °C)	16.3

<sup>a</sup> Ref. [63].

TABLE 87.12. Fluorocarbons and derivatives (20 °C) [64, 194]

(Cap. Rise)	
<i>p</i> -Difluorobenzene	27.0
Perfluorotrihexylamine	18.3
Perfluorotributylamine	16.3
Perfluorotripropylamine	15.2
Perfluorodibutyl ether	13.4
1,1,1,3,3,3-Hexachloro-2,2-difluoropropane	32.6
1,1,1,3,3,3-Pentachloro-2,2,3-trifluoropropane	27.8
1,2,2,3-Tetrachloro-1,1,3,3-tetrafluoropropane	22.8
2,2,3,3-Tetrafluoro-1-propanol	27.6
2,2,3,3,4,4,5,5-Octafluoro-1-pentanol	24.5
2,2,3,3,4,4,5,5,6,6,7,7-Dodecafluoro-1-heptanol	23.8

TABLE 87.13. Fluorinated esters and ethers (20 °C) [56]

(Method not given)	
Hexyl heptafluorobutyrate	19.2
Octadecyl heptafluorobutyrate	25.1
Butyl pentadecafluorooctanoate	18.7
1,6-Hexanediol bis(heptafluorobutyrate)	21.5
1,10-Decanediol bis(heptafluorobutyrate)	23.0
1,6-Hexanediol bis(7H-dodecafluoroheptanoate)	25.9
1,6-Hexanediol bis(pentadecafluorooctanoate)	20.6
2-Ethyl-2-(hydroxymethyl)-1,3-propanediol heptafluorobutyrate	21.2
1H,1H,9H-Hexadecafluorononyl 2-ethylhexanoate	23.1
Bis(1H,1H,5H-octafluoropentyl) glutarate	27.5
Bis(1H,1H-heptafluorobutyl) 3-methylglutarate	20.5
Bis(1H,1H,5H-octafluoropentyl) 3-methylglutarate	26.8
Bis(1H,1H-undecafluorohexyl) 3-methylglutarate	19.9
Bis(1H,1H,7H-dodecafluoroheptyl) 3-methylglutarate	25.6
Bis(1H,1H-pentadecafluorooctyl) 3-methylglutarate	19.5
Bis(1H,1H,9H-hexadecafluorononyl) 3-methylglutarate	25.0
Bis(1H,1H,5H-octafluoropentyl) adipate	27.7
Bis(1H,1H,7H-dodecafluoroheptyl) adipate	26.1
Bis(1H,1H,9H-hexadecafluorononyl) 3- <i>tert</i> -butyl-adipate	24.9
Bis(1H,1H-heptafluorobutyl) sebacate	22.4
Bis(1H,1H,5H-octafluoropentyl) sebacate	28.2
Bis(1H,1H,7H-dodecafluoroheptyl) pinate	26.2
Bis(1H,1H,5H-octafluoropentyl) phthalate	28.0
Tris(1H,1H,5H-octafluoropentyl) tricarballylate	27.2
1H,1H,7H-Dodecafluoroheptyl methyl ether	22.1
Bis(1H,1H,7H-dodecafluoroheptoxy)hexane	25.3

## Fluorinated esters [61]

## (Ring Detachment)

Diethyl perfluoroadipate (27.0)	22.7
Dibutyl perfluoroadipate (26.0)	22.2
Bis(1H,1H-heptafluorobutyl) adipate (25.8)	20.4
2,2,3,3,4,4,5,5-Octafluoro-1,6-hexanediol dibutyrate	23.9
1,5-Pentanediol di(trifluoroacetate) (26.2)	24.4
1,5-Pentanediol di(perfluorobutyrate) (26.2)	20.6
1,6-Hexanediol di(perfluorobutyrate) (26.2)	22.2
1,5-Pentanediol di(perfluorooctanoate) (26.2)	19.1
Pentaerythritol tetra(perfluorobutyrate) (26.0)	18.5
<i>m</i> -(Trifluoromethyl)benzyl perfluorobutyrate (26.5)	24.8

TABLE 87.14. Organic phosphoryl compounds (20 °C) [55]

(Drop Wt.-A)

Diisopropyl phosphonate.....	26.4
Diethyl phosphorofluoridate.....	25.9
Diisopropyl phosphorofluoridate.....	24.5
Diethyl phosphorochloridate.....	32.0
Diisopropyl phosphorochloridate.....	28.3
Methyl phosphorodichloridate.....	34.9
Ethyl phosphorodichloridate.....	32.8
Diethyl dimethylphosphoramidate.....	30.3
Ethyl dimethylphosphoramidochloridate.....	34.9
Dimethylphosphoramidic difluoridate.....	25.1
Dimethylphosphoramidic dichloride.....	36.1
Diethylphosphoramidic dichloride.....	35.7
Tetramethylphosphordiamidic fluoride.....	33.4

TABLE 87.15. Esters of boric acid (20 °C) [3]

(Max. Bubble Pressure-A)

Propyl borate.....	22.48
Isopropyl borate.....	19.02
Butyl borate.....	24.42
Heptyl borate.....	26.15
Octyl borate.....	28.18
Decyl borate.....	29.38

TABLE 87.16. Germanium compounds [201]

(Max. Bubble Pressure-A)

Germanium tetrachloride (30 °C).....	22.44
Germanium tetrabromide (30 °C).....	35.51
Germanium tetrabromide (50 °C).....	33.70
Tetraethylgermanium (30 °C).....	22.96
Tetraethoxygermanium (30 °C).....	23.00

TABLE 87.17. Sulfur halides (20 °C) [57, 58]

(Method not given)

Sulfur dichloride.....	37.2
Trisulfur dichloride.....	47.8
Tetrasulfur dichloride.....	52.5
Sulfur monobromide.....	39.1
Trisulfur dibromide.....	41.0
Tetrasulfur dibromide.....	42.8

TABLE 87.18. Miscellaneous compounds

Compound	Temp. °C	Surface tension	Refer- ence
2,2'-Thiodiethanol.....	20	54.0	50
4-Hydroxy-4-methyl-2-pentanone.....	20	31.0	66
4-Methyl-3-penten-2-one.....	20	28.4	66
Triethylboron.....	30	19.84	128
Disilthiane.....	18	22.31	143
Sulfuryl chlorofluoride.....	0	17.2	17
Chlorotrinitromethane.....	20	34.2	265
1,1-Di- <i>p</i> -tolylethane.....	30	34.5	15
1- <i>o</i> -Tolyl-1- <i>p</i> -tolylethane.....	30	35.5	15
1- <i>m</i> -Tolyl-1- <i>o</i> -tolylethane.....	30	36.1	15
2,2-Di- <i>p</i> -tolylbutane.....	30	33.6	15
<i>m,m'</i> -Bitolyl.....	20	39.0	150
Cyclo-octadiene.....	20	31.46	30
Diolein succinate.....	70.2	25.35	60
Distearin succinate.....	94.6	28.01	60
Boron trifluoride—			
ethyl methyl etherate.....	25	30.8	129
Ozone.....	-182.7	38.1	117
1,1-Dichloro-2-propanone.....	20	31.91	86
2,2-Dichloroethyl sulfide.....	20	42.82	85
4-Methyl-4-penten-2-one.....	20	23.0	213
1- <i>o</i> -Allylglycerol.....	20	33.3	41

## 4. Figures

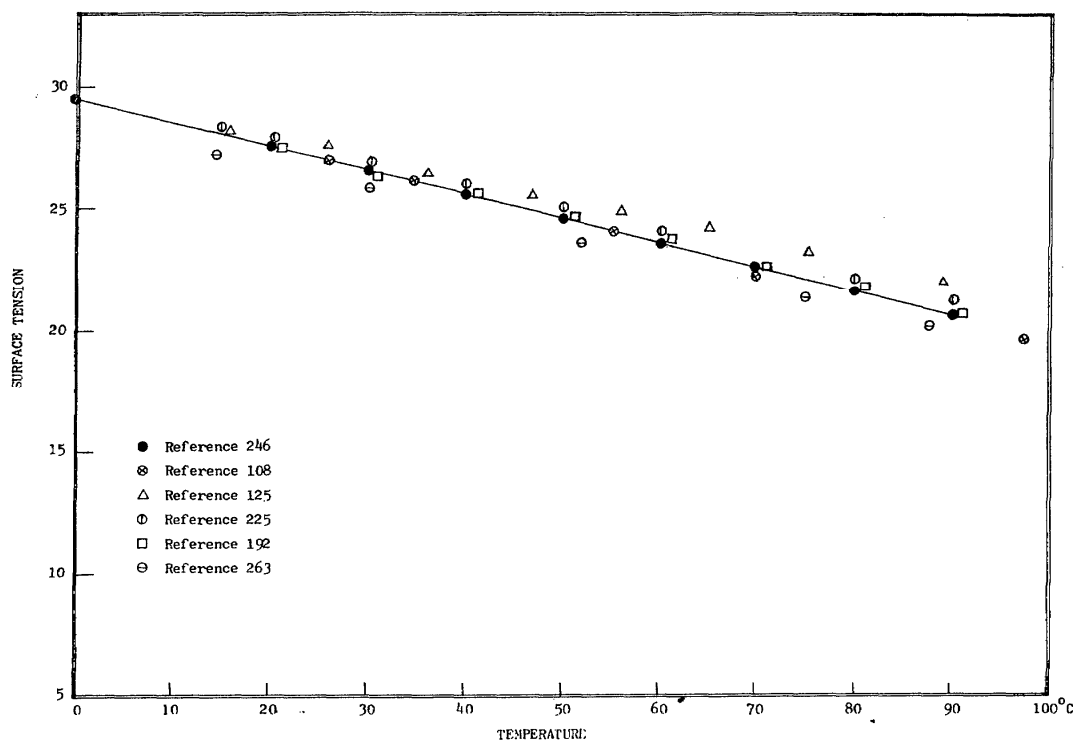


FIGURE 1. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurement for acetic acid (solid line passes thru recommended values).

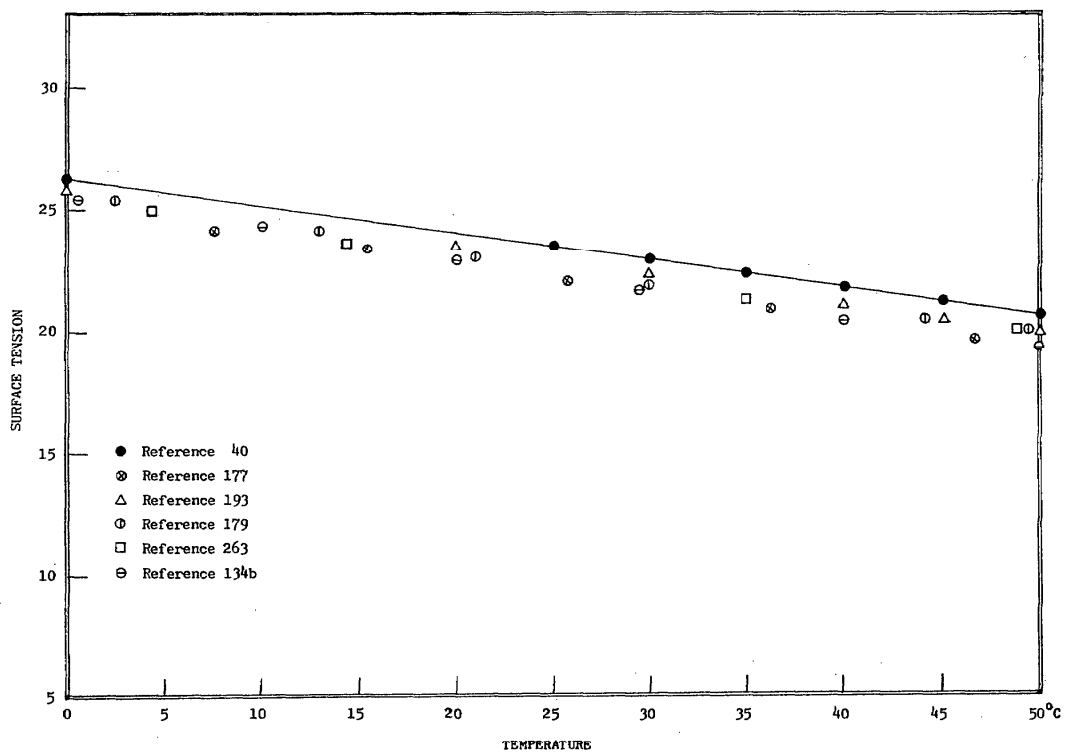


FIGURE 2. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for acetone (solid line passes thru recommended values).

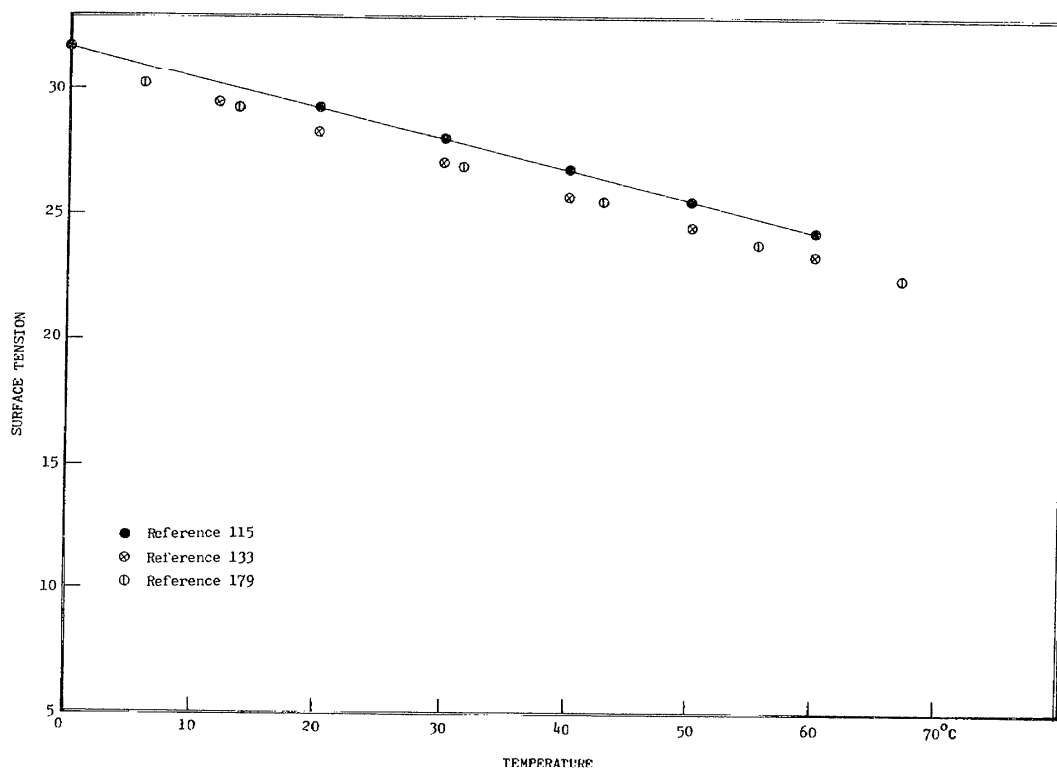


FIGURE 3. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for acetonitrile (solid line passes thru recommended values).

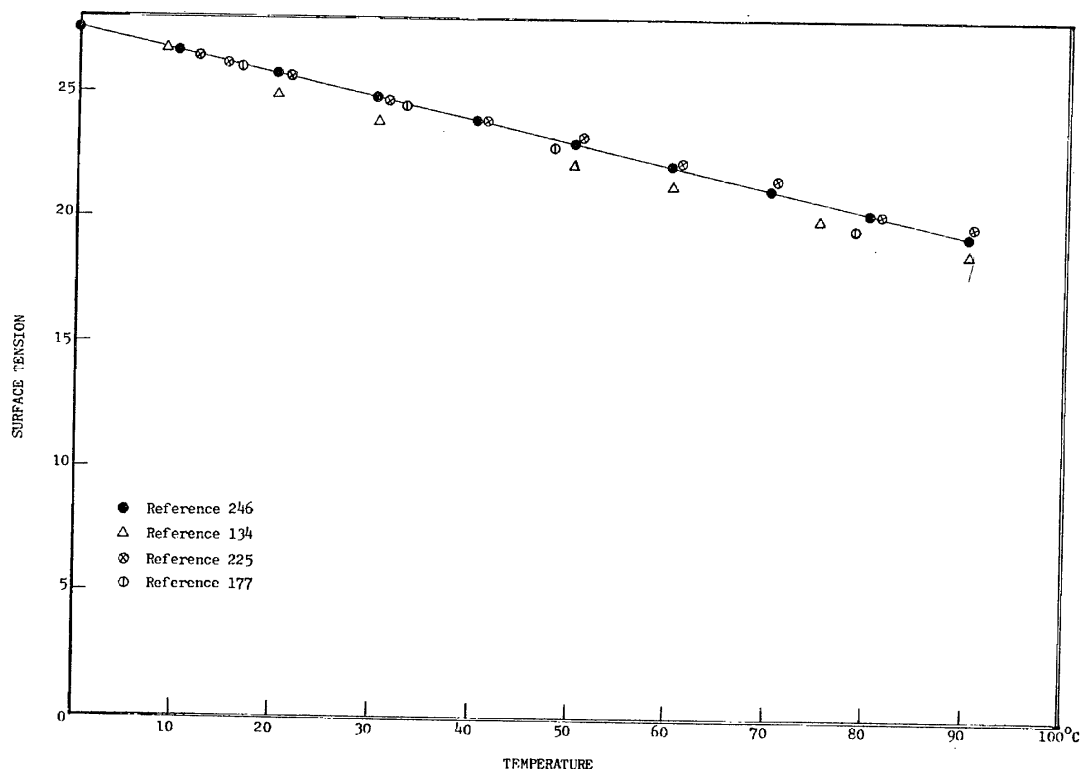


FIGURE 4. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for allyl alcohol (solid line passes thru recommended values).

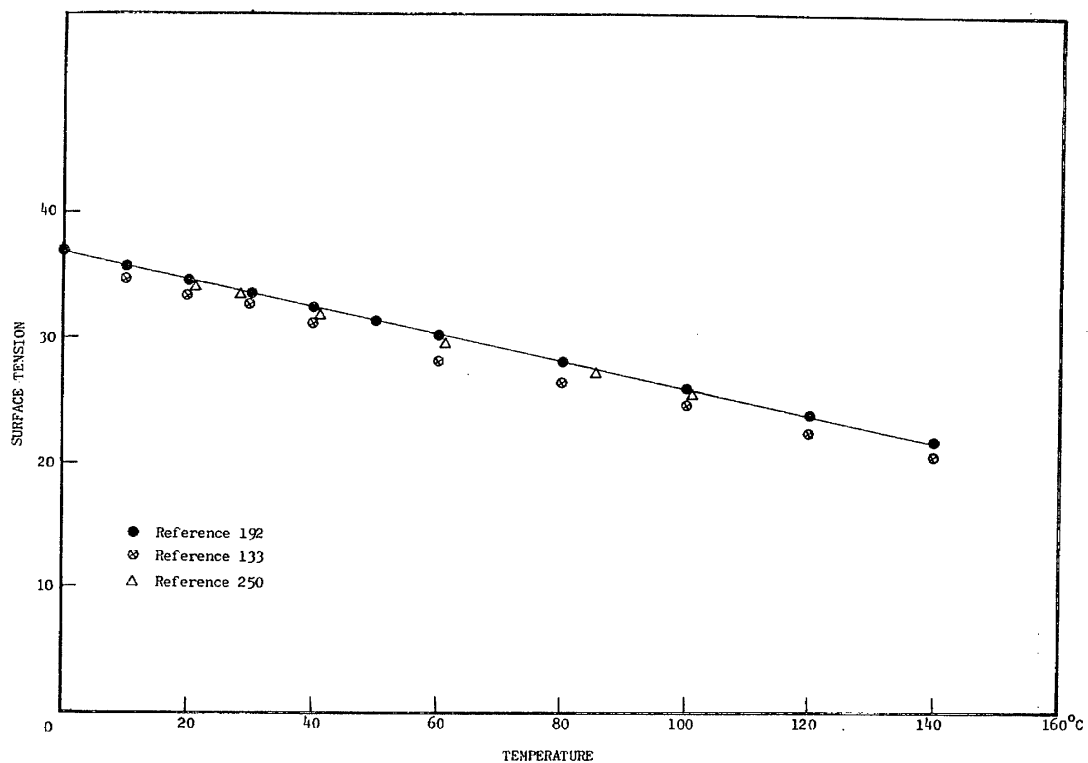


FIGURE 5. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for allyl isothiocyanate (solid line passes thru recommended values).

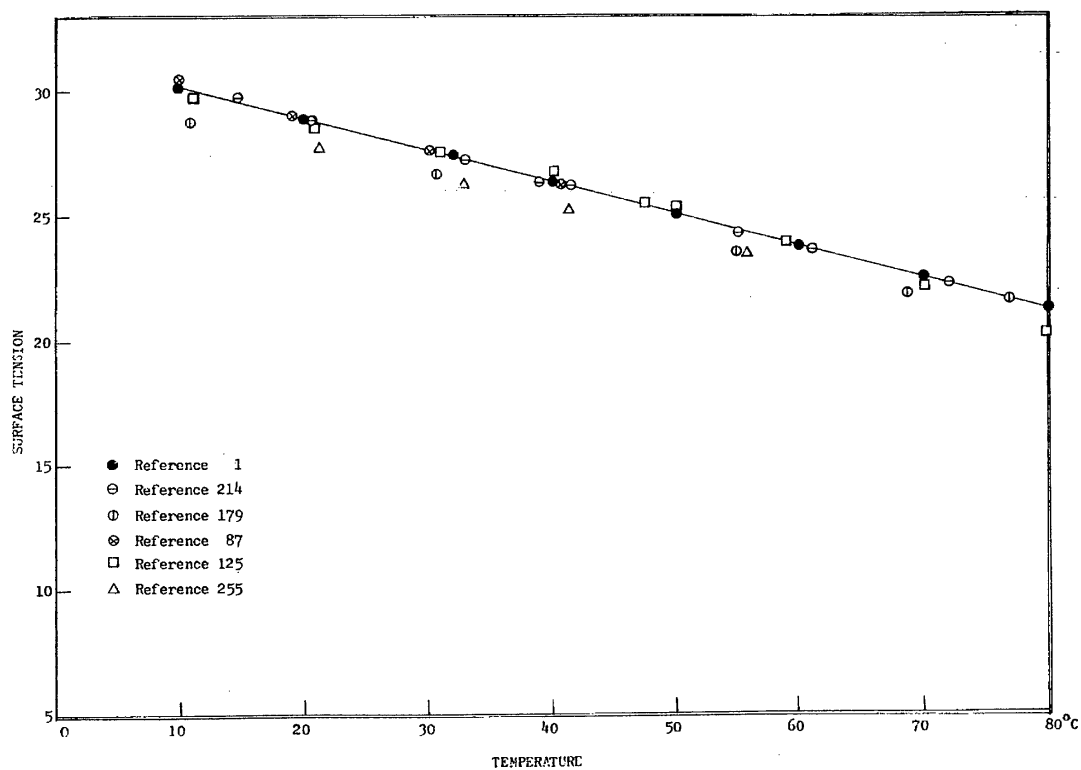


FIGURE 6. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for benzene (solid line passes thru recommended values).

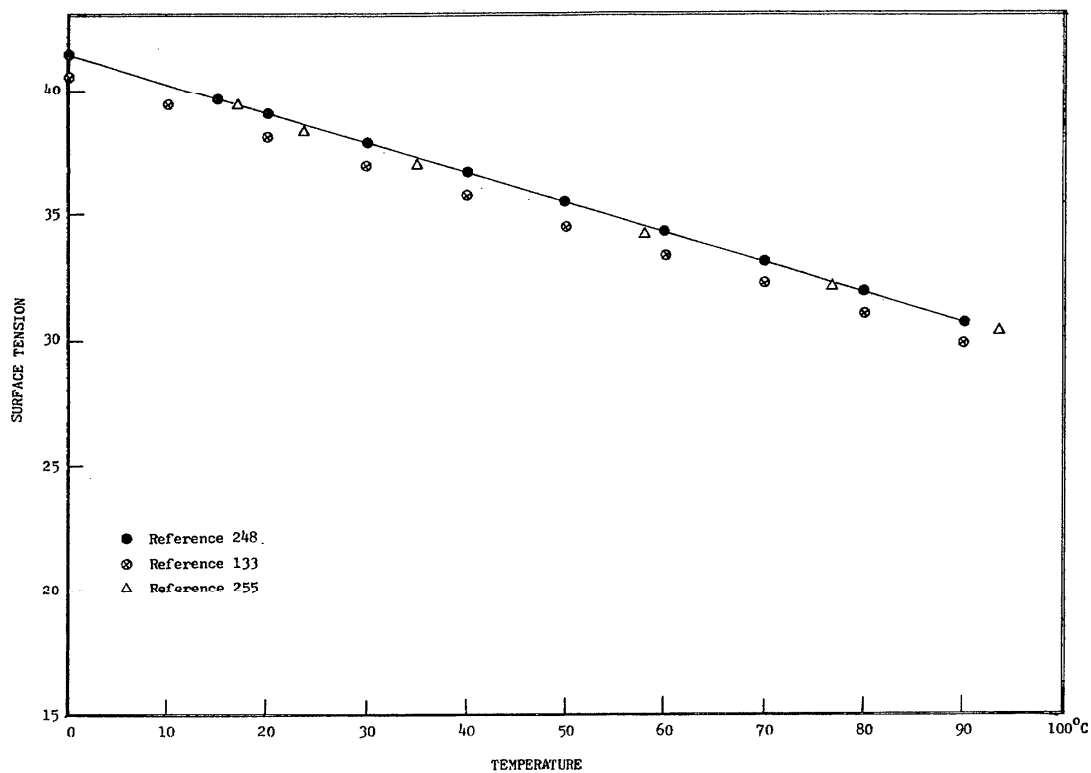


FIGURE 7. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for benzenethiol (solid line passes thru recommended values).

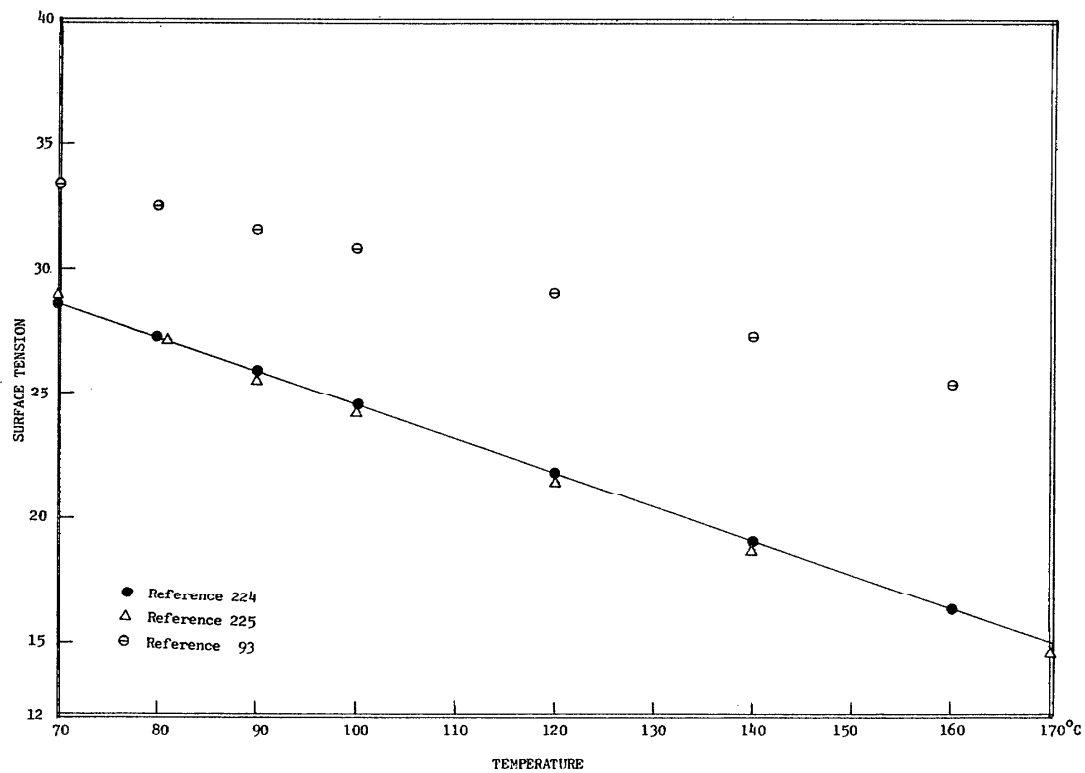


FIGURE 8. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for benzyl alcohol (solid line passes thru recommended values).



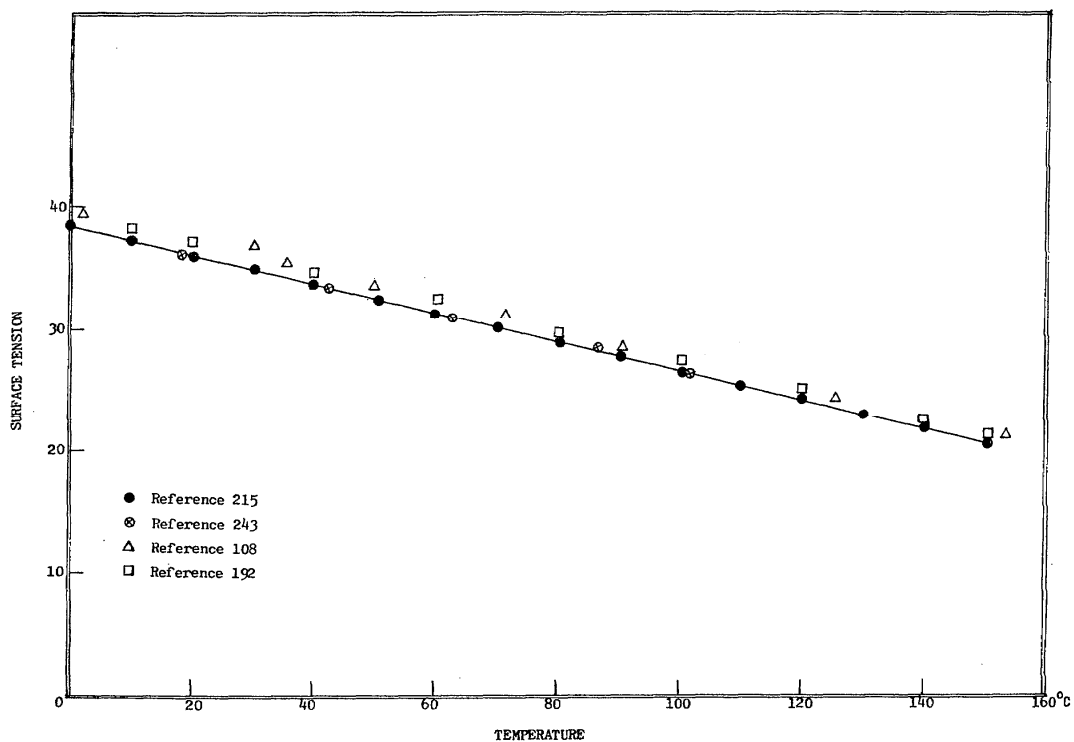


FIGURE 9. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for bromobenzene (solid line passes thru recommended values).

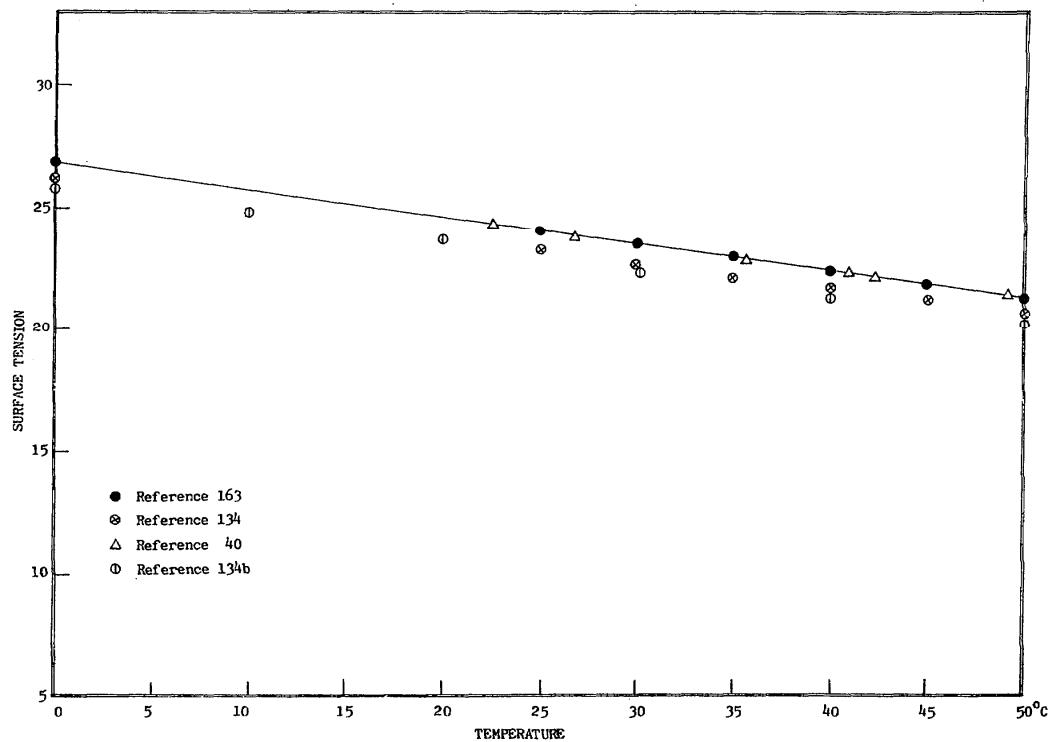


FIGURE 10. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 2-butanone (solid line passes thru recommended values).

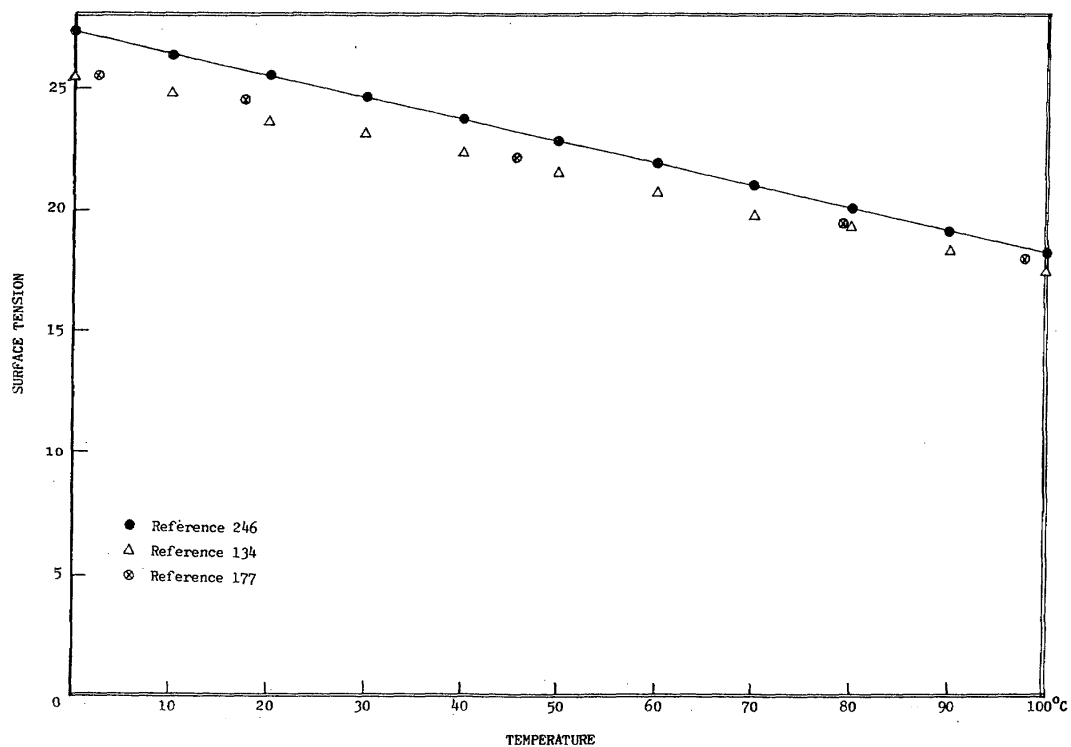


FIGURE 11. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for butyl alcohol (solid line passes thru recommended values).

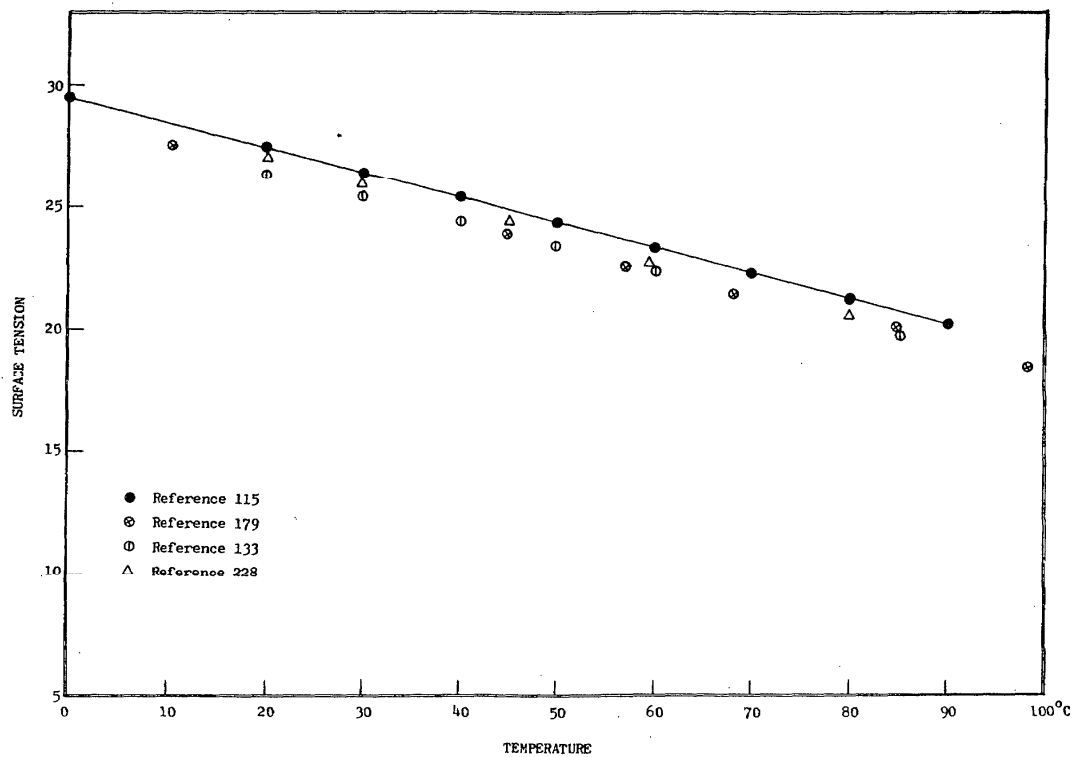


FIGURE 12. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for butyronitrile (solid line passes thru recommended values).

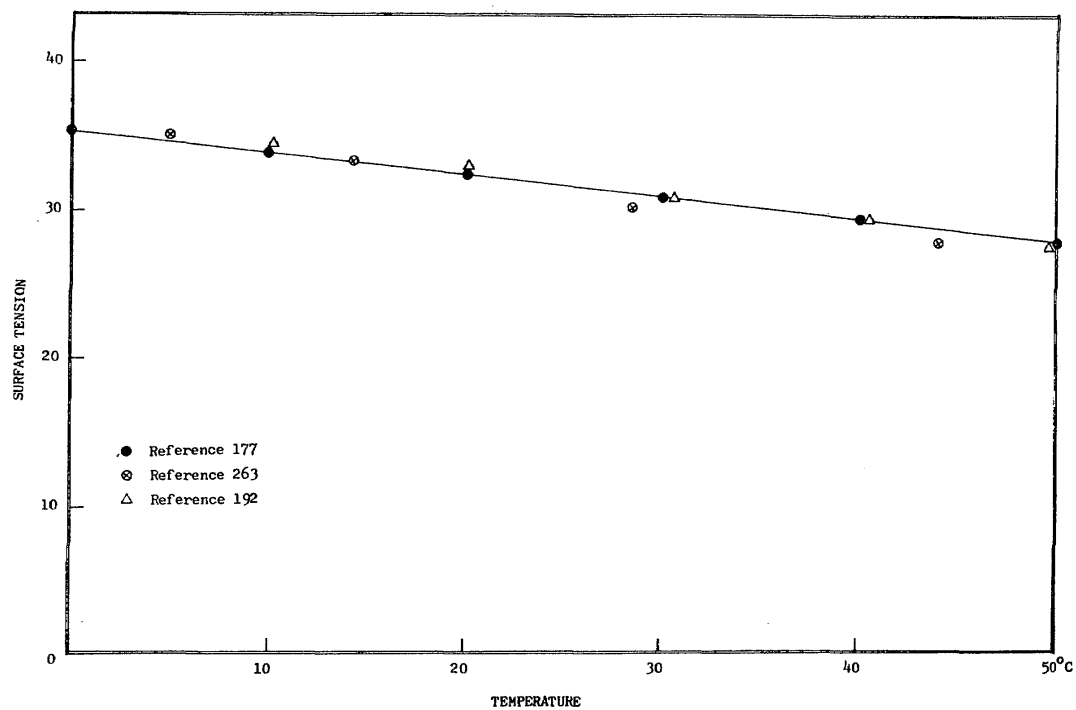


FIGURE 13. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurement for carbon disulfide (solid line passes thru recommended values).

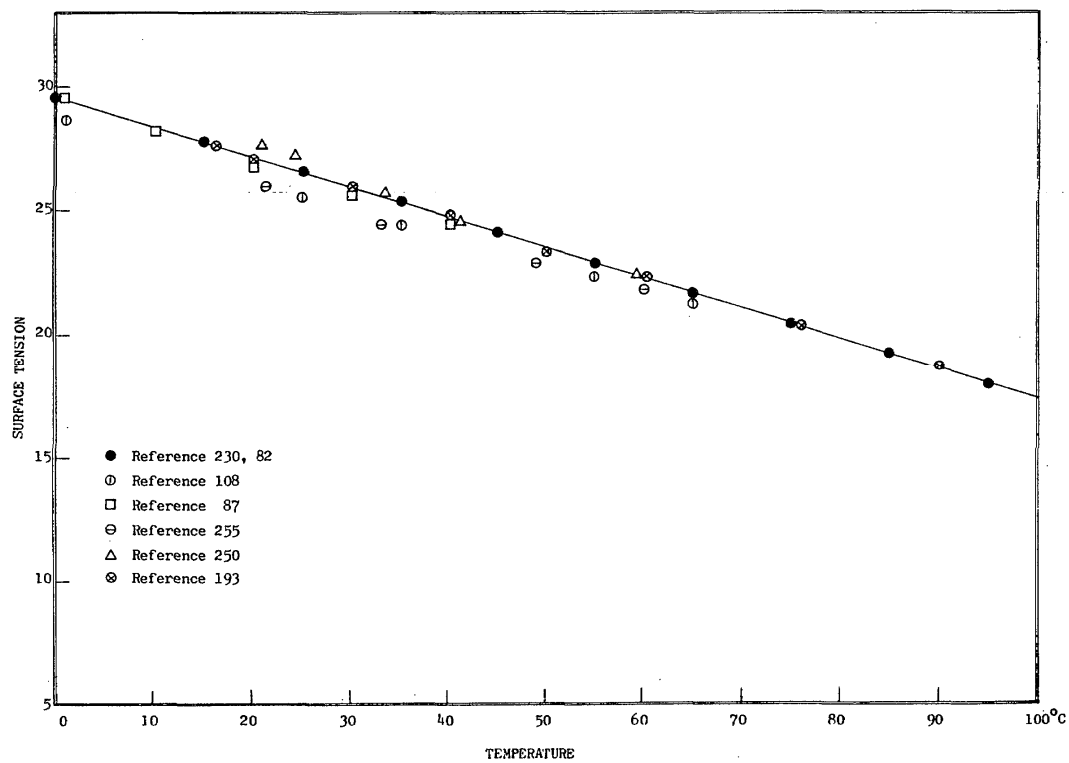


FIGURE 14. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for carbon tetrachloride (solid line passes thru recommended values).

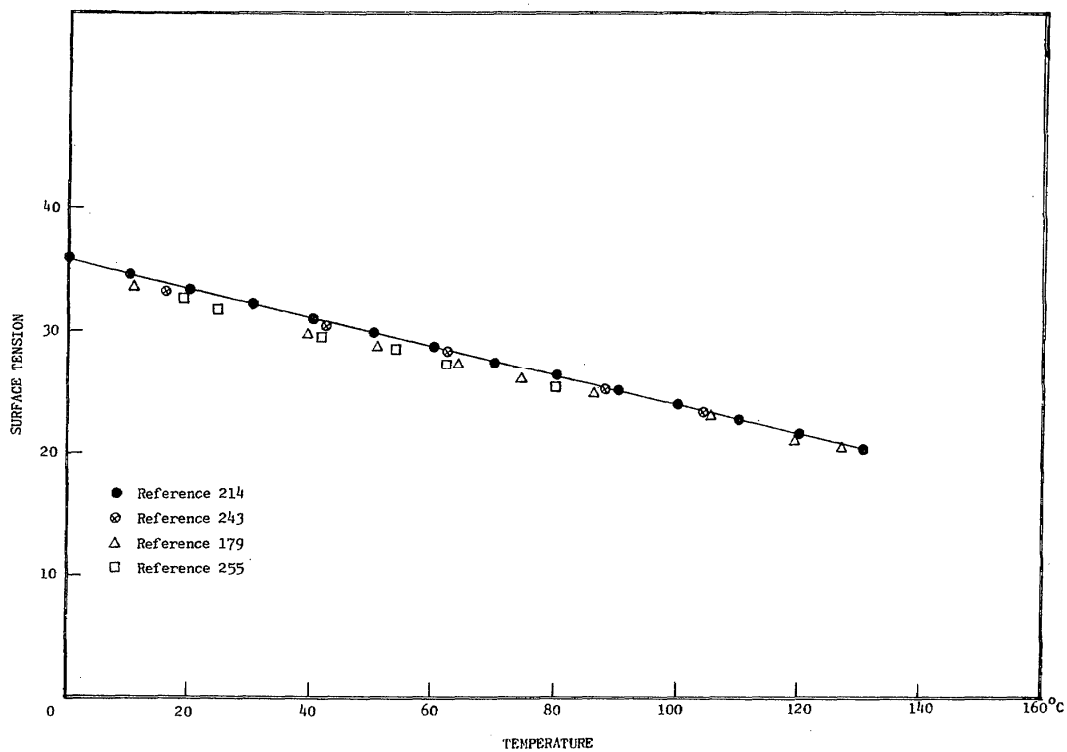


FIGURE 15. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for chlorobenzene (solid line passes thru recommended values).

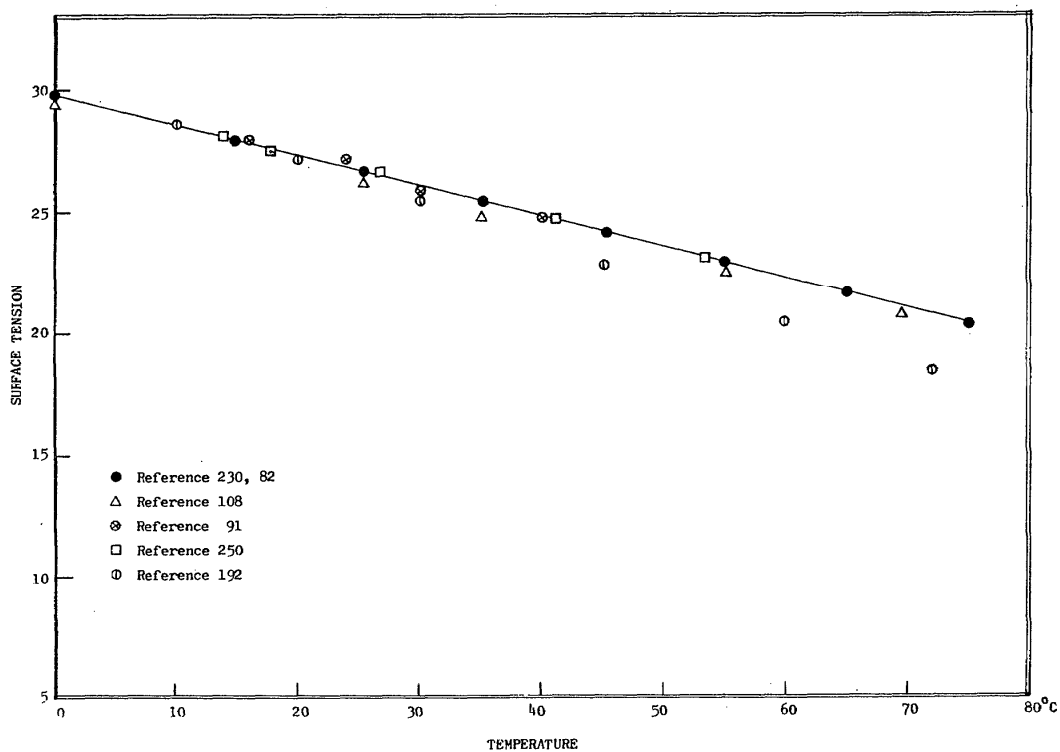


FIGURE 16. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for chloroform (solid line passes thru recommended values).

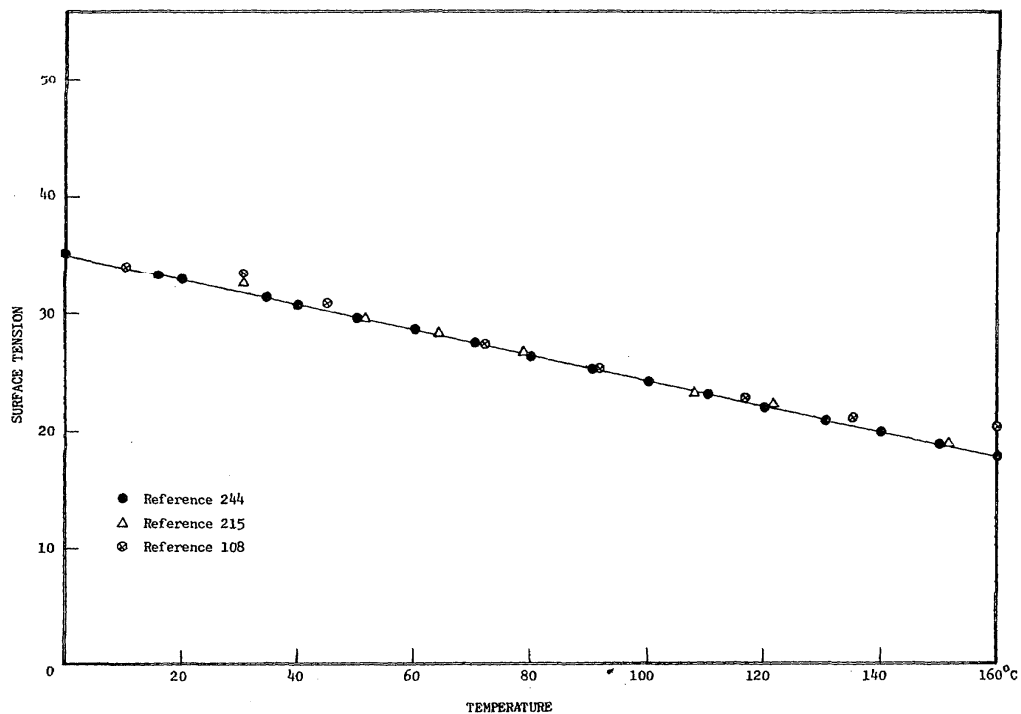


FIGURE 17. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurement for *p*-chlorotoluene (solid line passes thru recommended values).

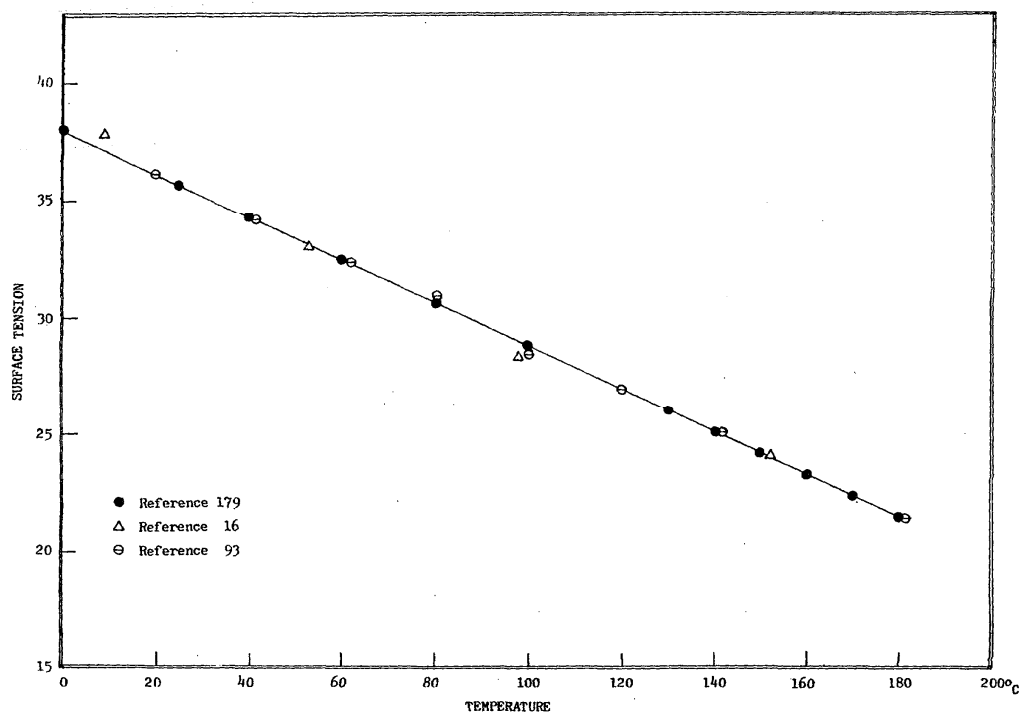


FIGURE 18. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *m*-cresol (solid line passes thru recommended values).

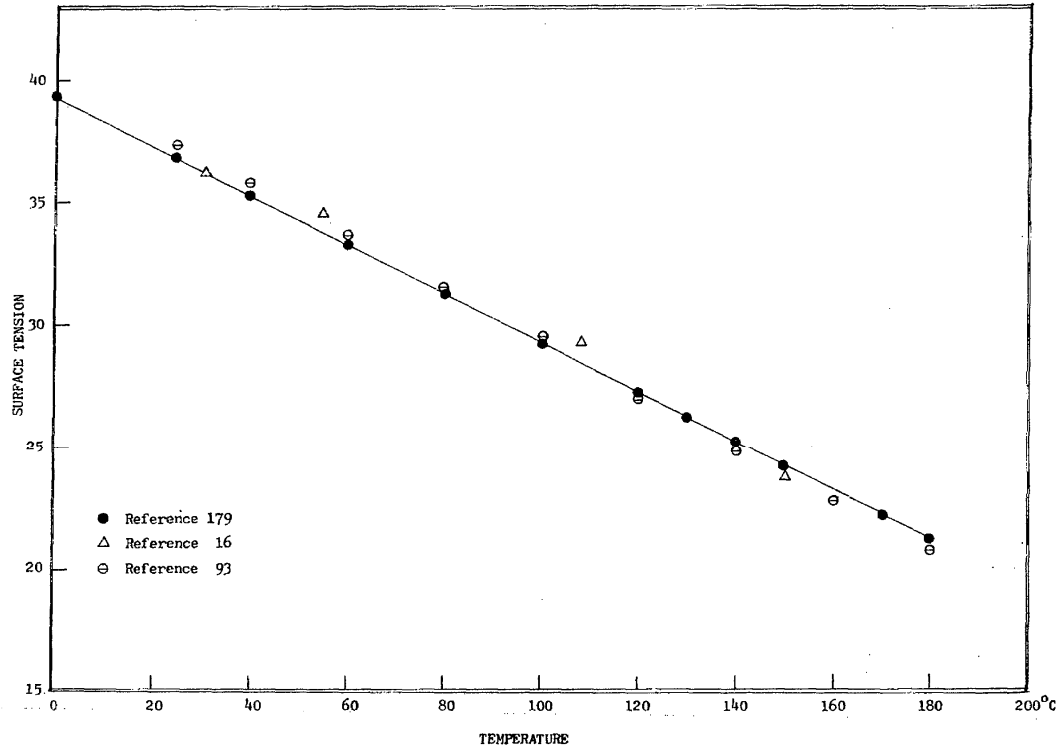


FIGURE 19. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurement for *o*-cresol (solid line passes thru recommended values).

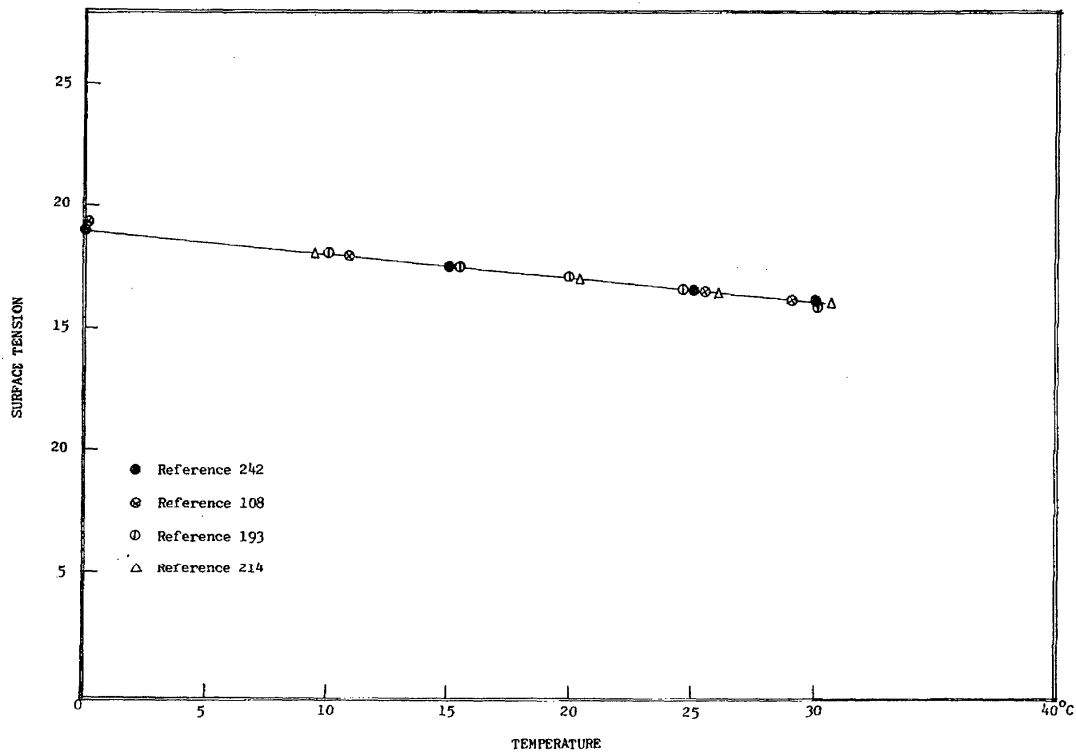


FIGURE 20. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for diethyl ether (solid line passes thru recommended values).

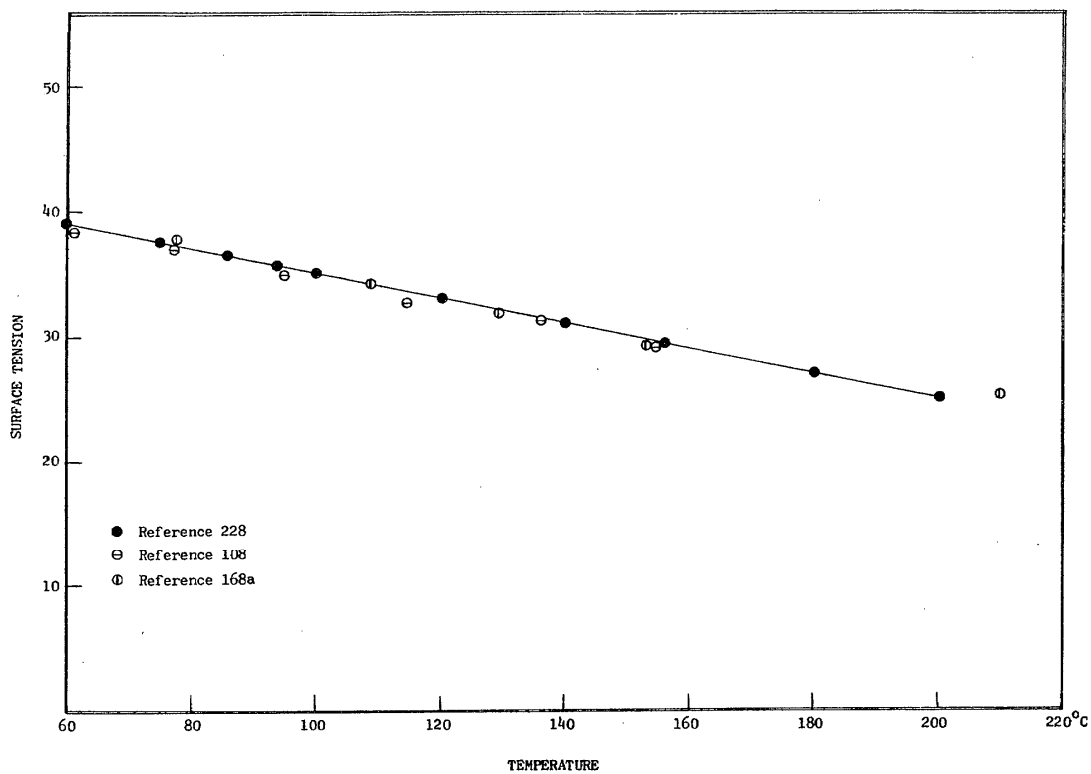


FIGURE 21. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for diphenylamine (solid line passes thru recommended values).

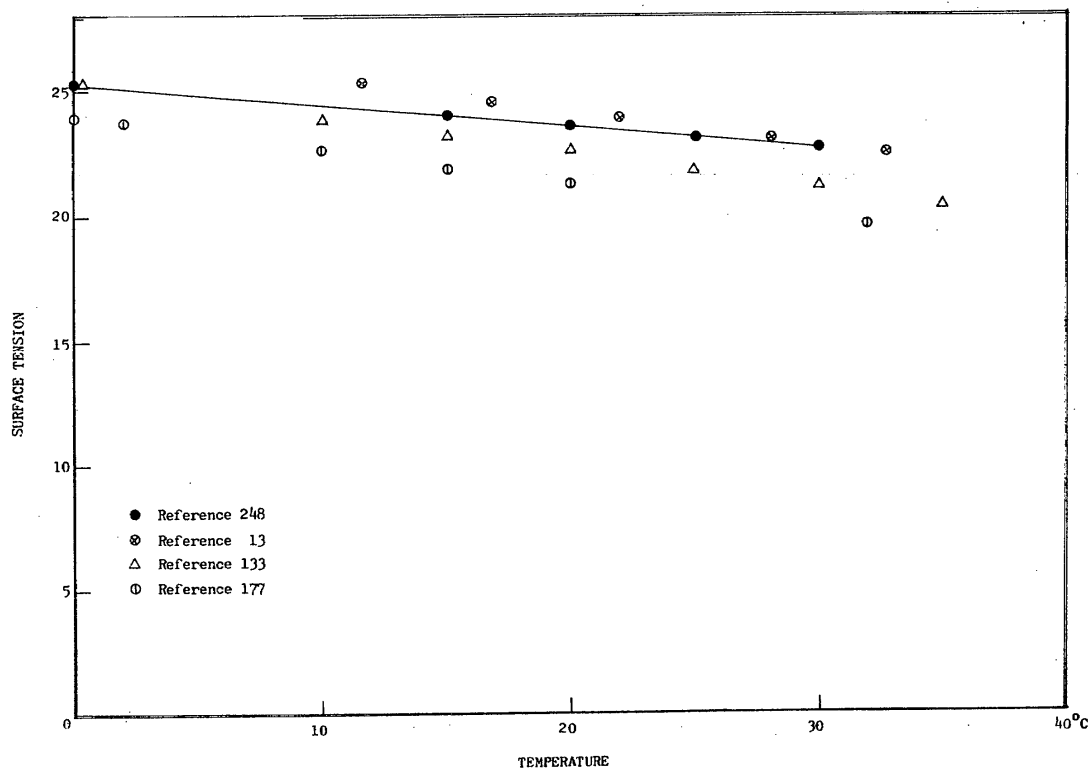


FIGURE 22. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for ethanethiol (solid line passes thru recommended values).

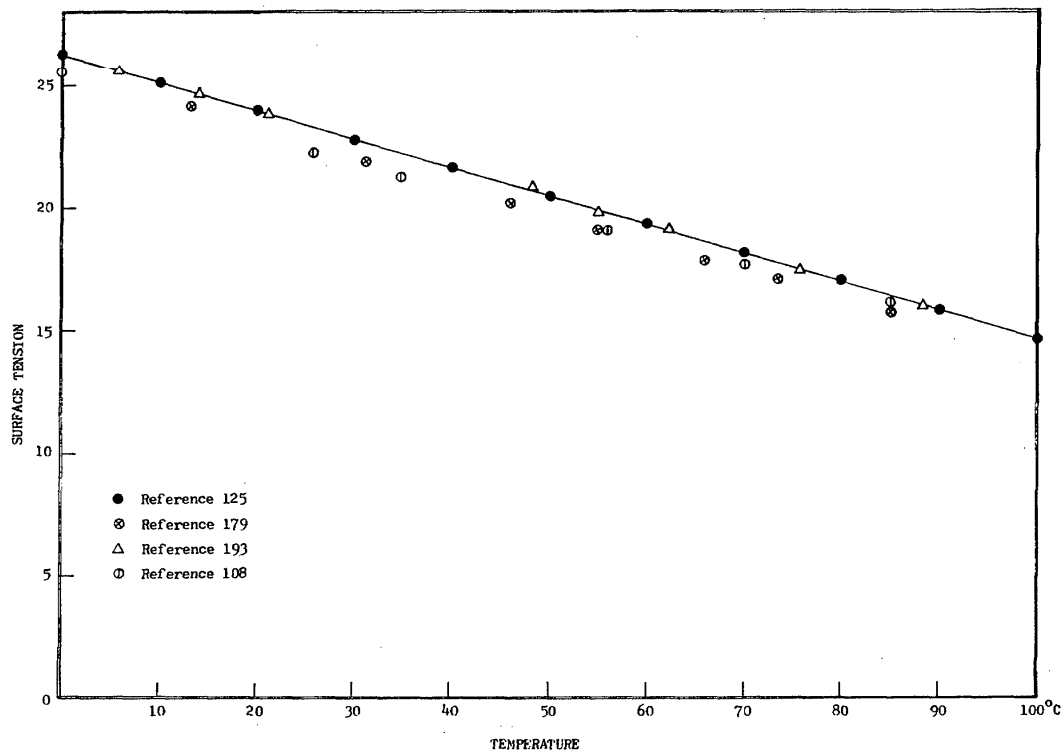


FIGURE 23. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for ethyl acetate (solid line passes thru recommended values).

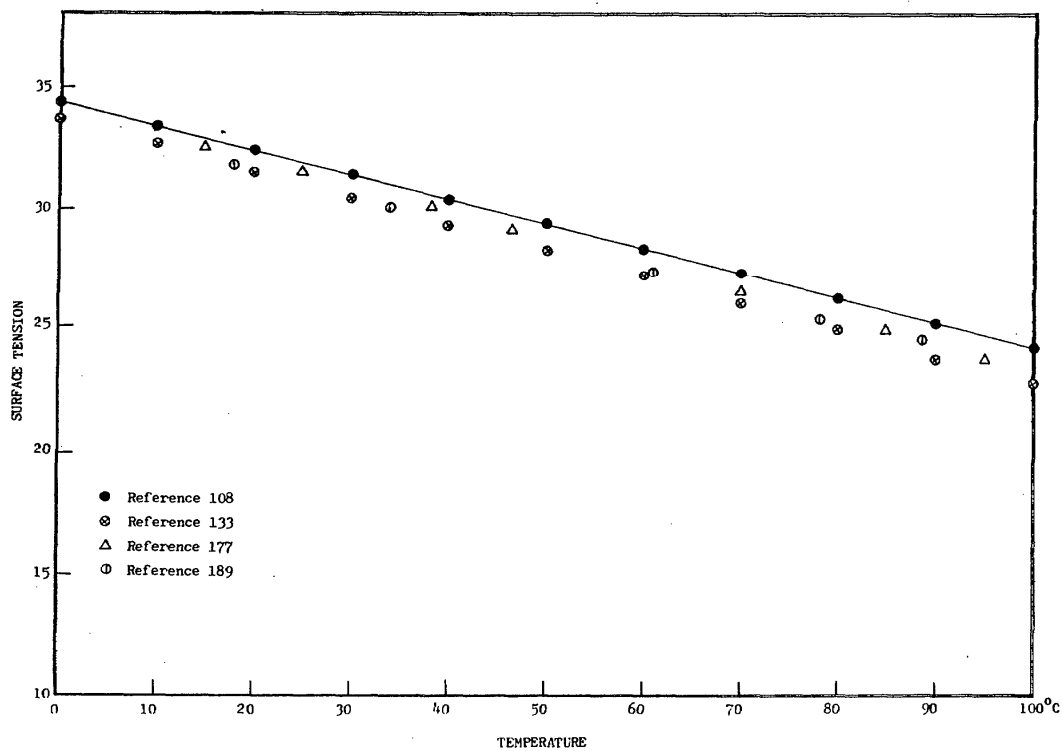


FIGURE 24. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for ethyl acetoacetate (solid line passes thru recommended values).



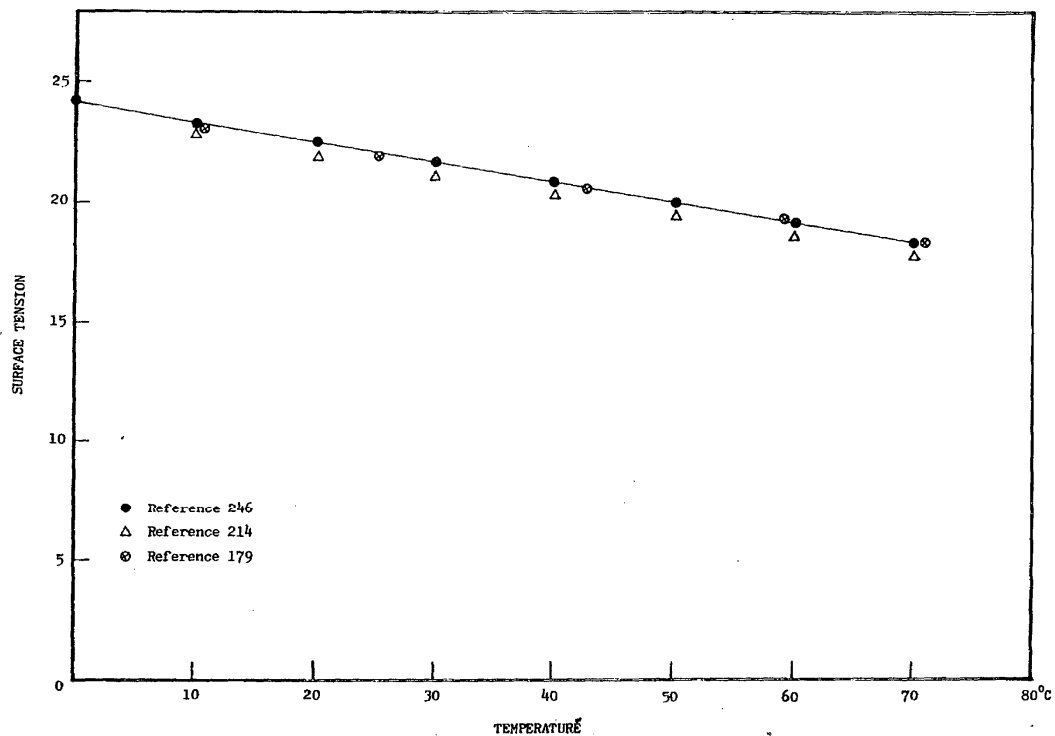


FIGURE 25. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for ethyl alcohol (solid line passes thru recommended values).

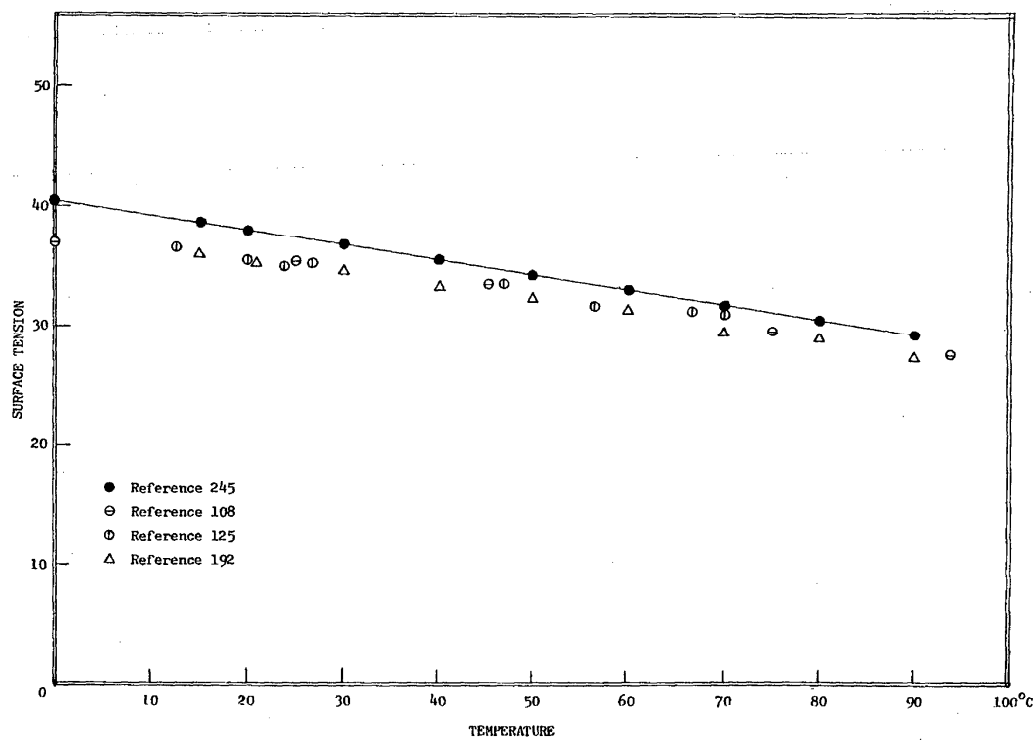


FIGURE 26. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for ethyl benzoate (solid line passes thru recommended values).

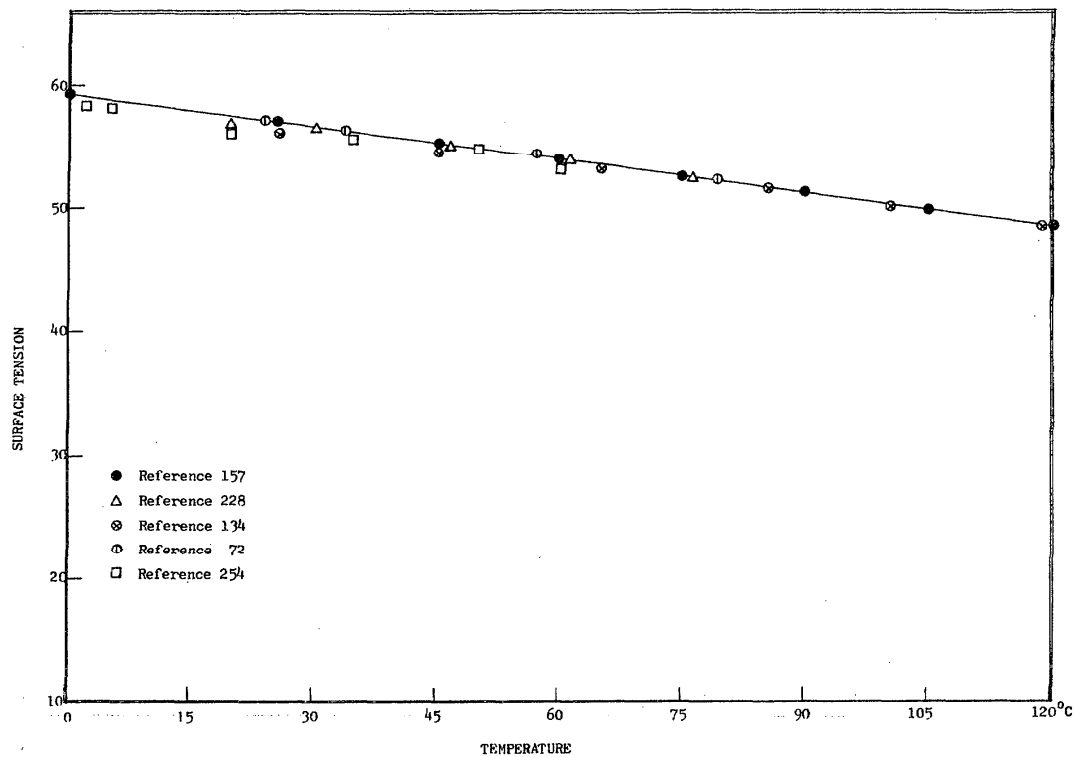


FIGURE 27. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for formamide (solid line passes thru recommended values).

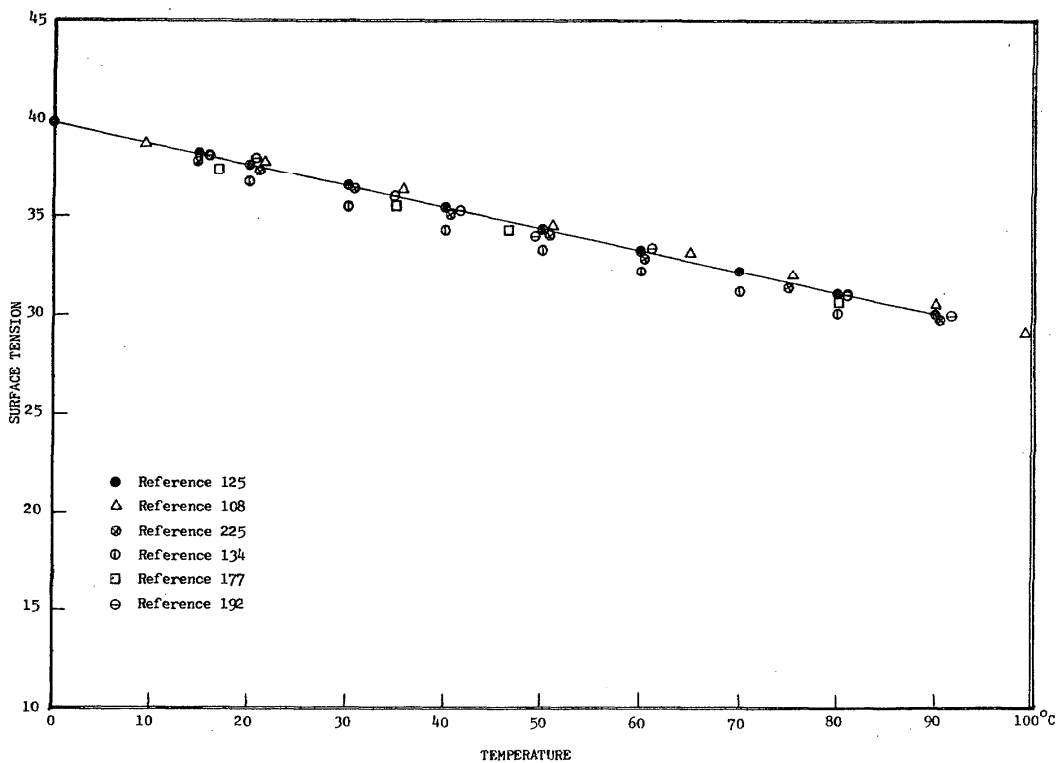


FIGURE 28. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for formic acid (solid line passes thru recommended values).

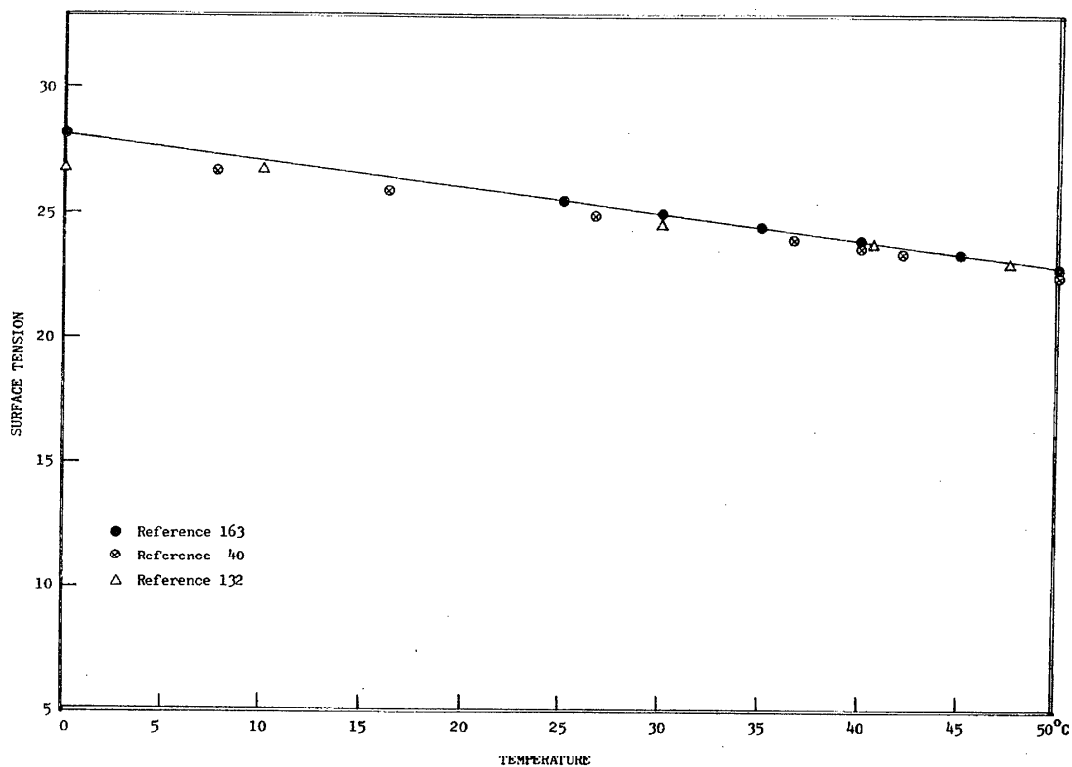


FIGURE 29. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 4-heptanone (solid line passes thru recommended values).

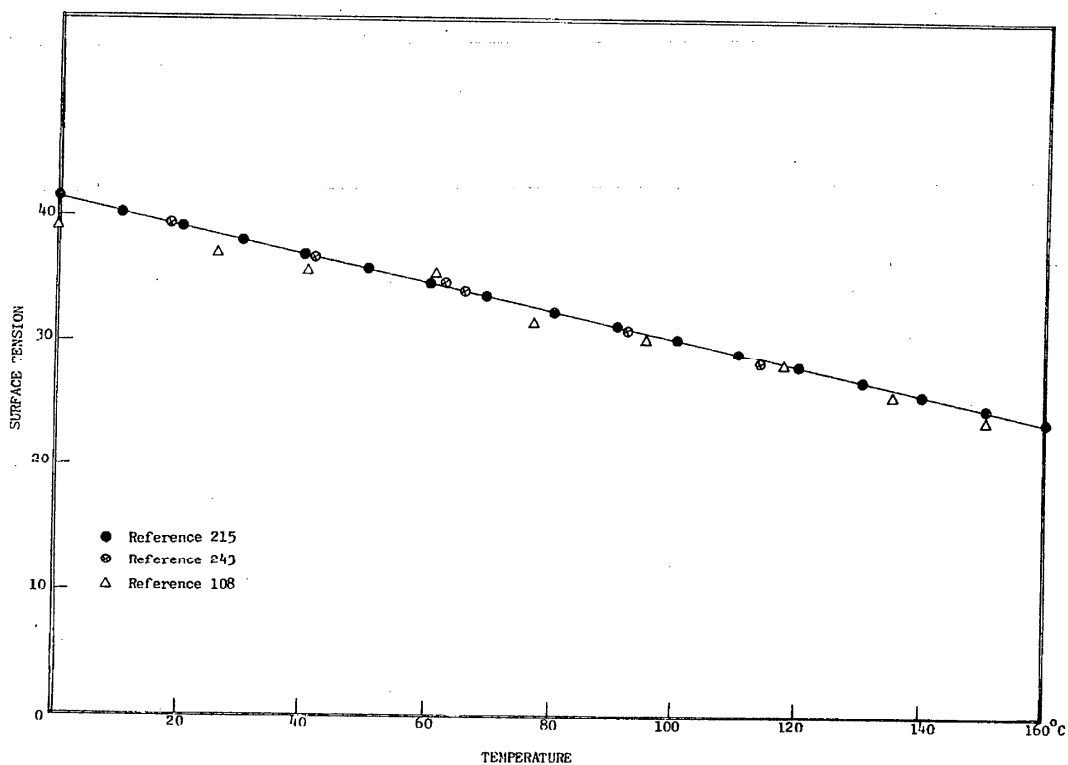


FIGURE 30. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for iodobenzene (solid line passes thru recommended values).

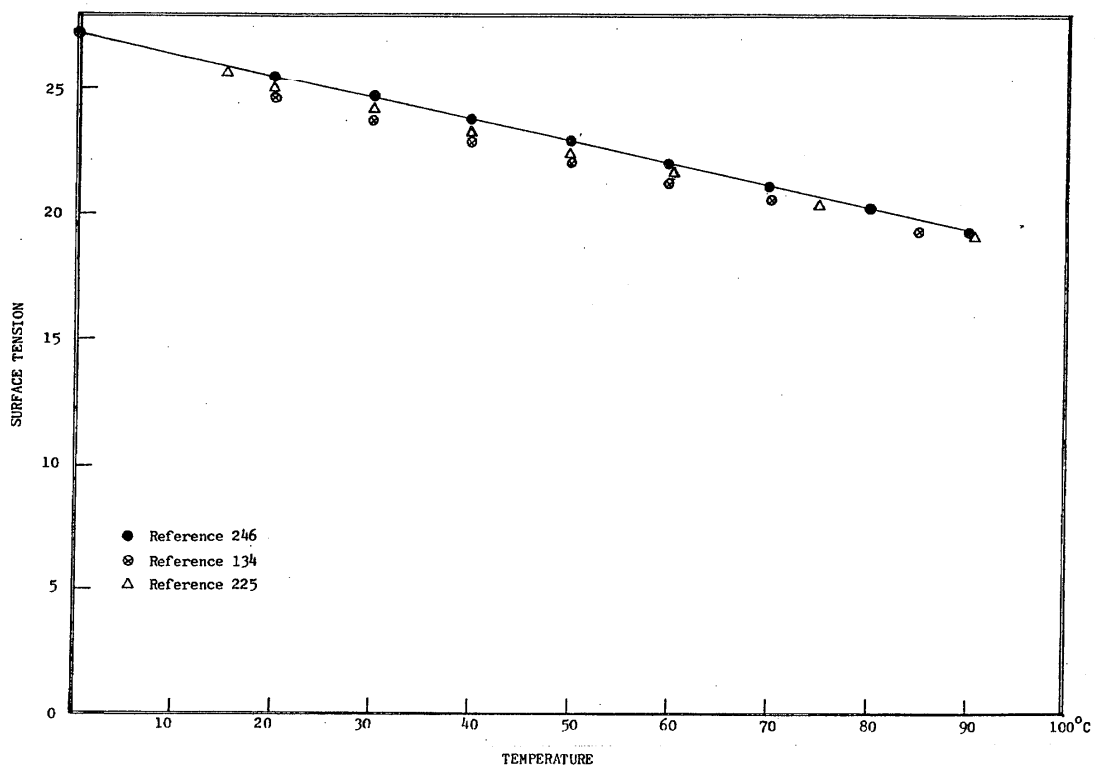


FIGURE 31. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for isobutyl alcohol (solid line passes thru recommended values).

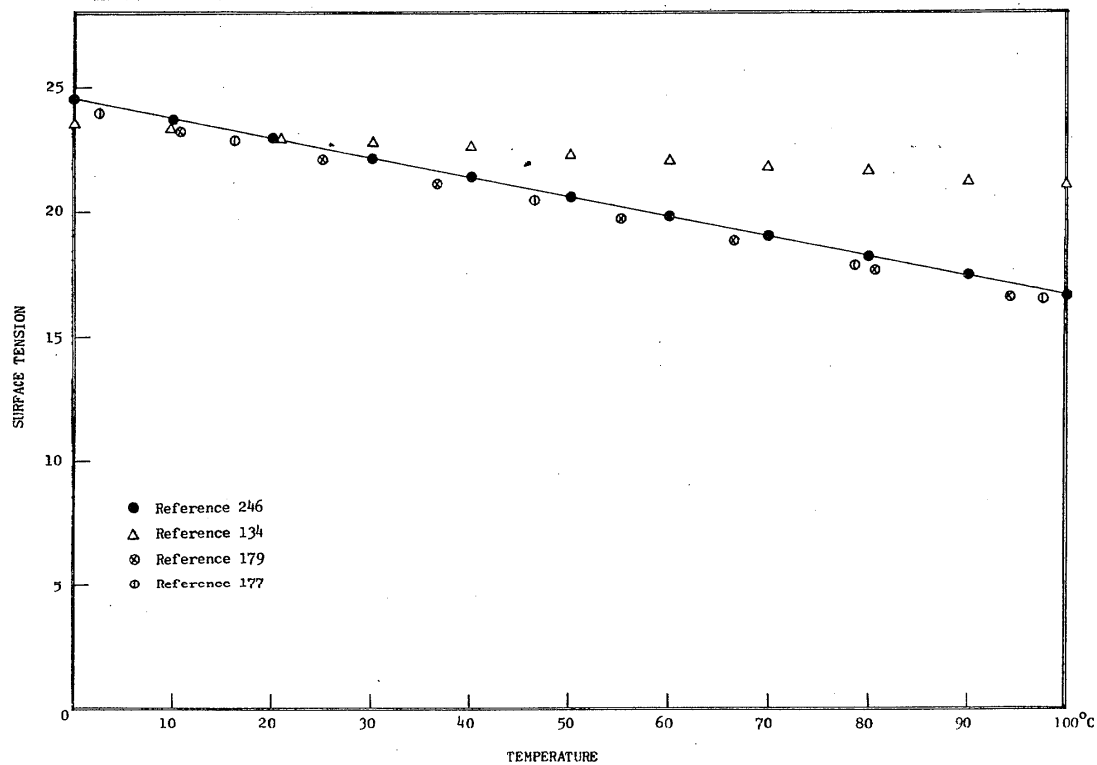


FIGURE 32. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for isovaleric acid (solid line passes thru recommended values).

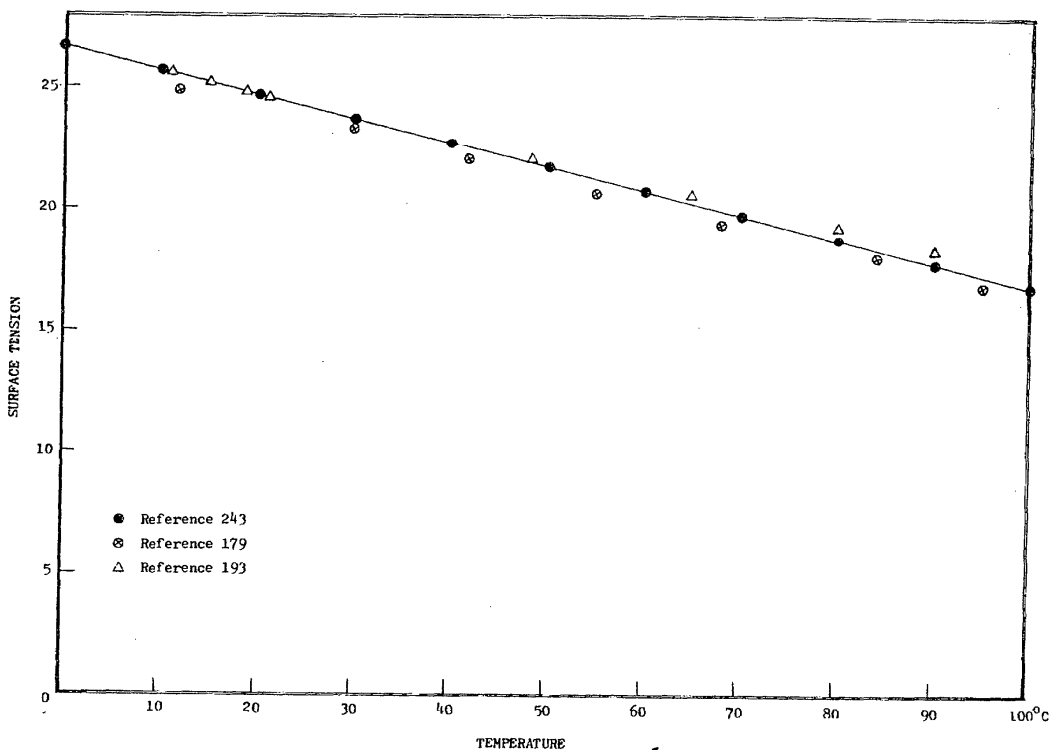


FIGURE 33. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurement for 3-methylbutanol (solid line passes thru recommended values).

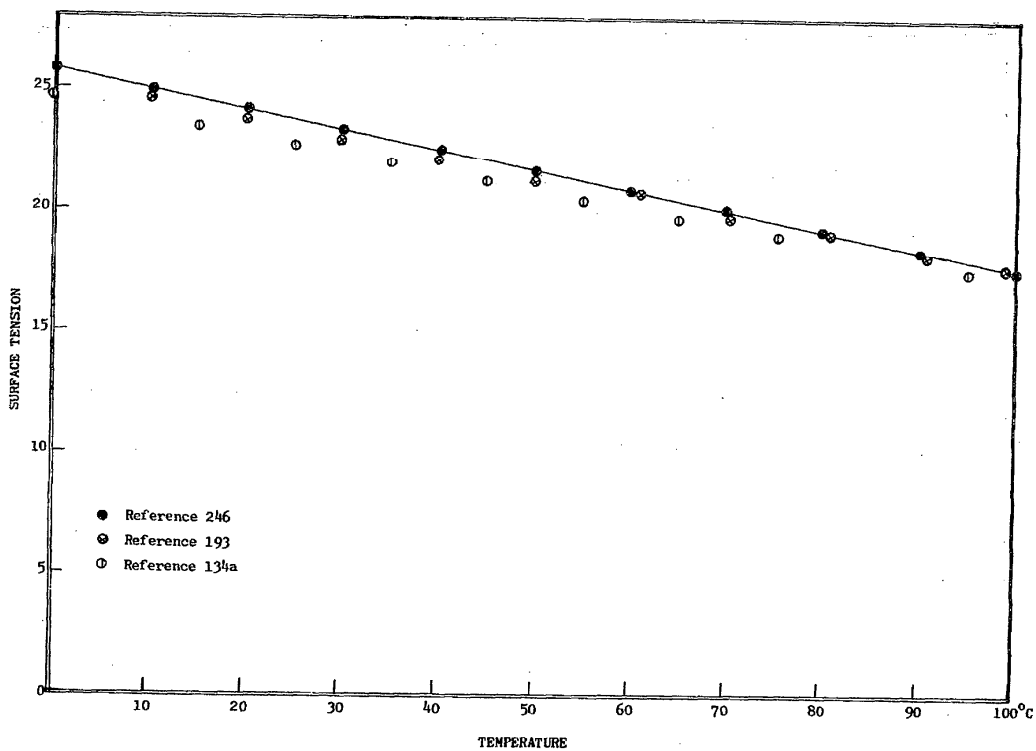


FIGURE 34. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 3-methylbutyl acetate (solid line passes thru recommended values).

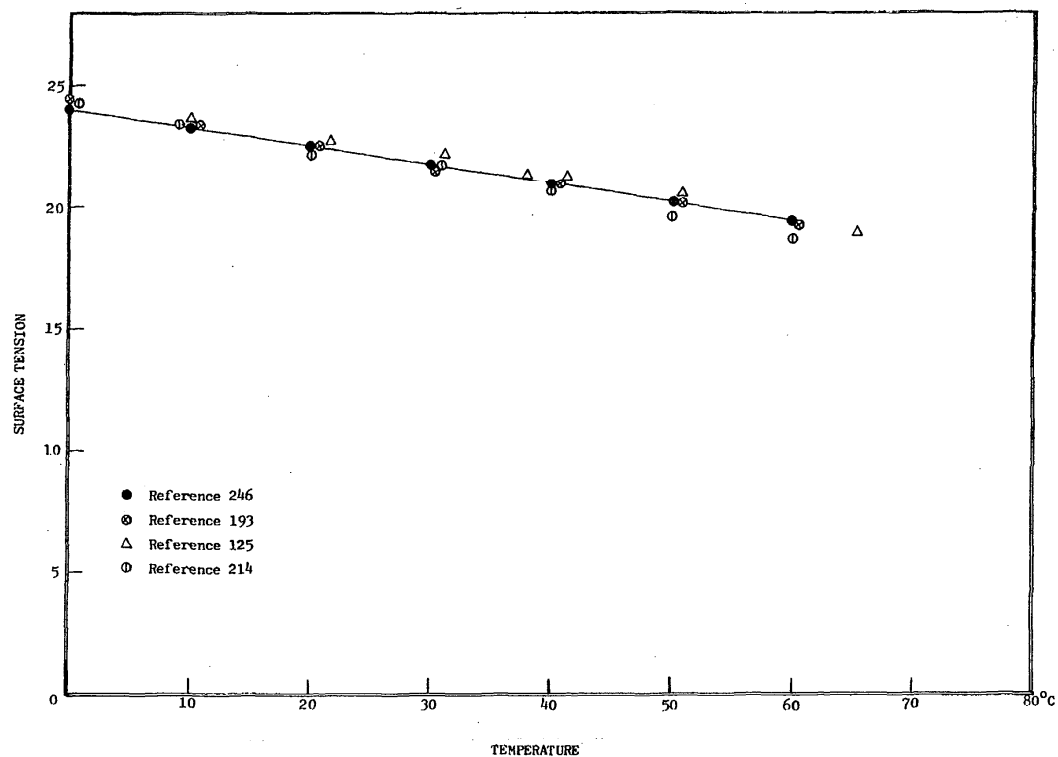


FIGURE 35. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for methyl alcohol (solid line passes thru recommended values).

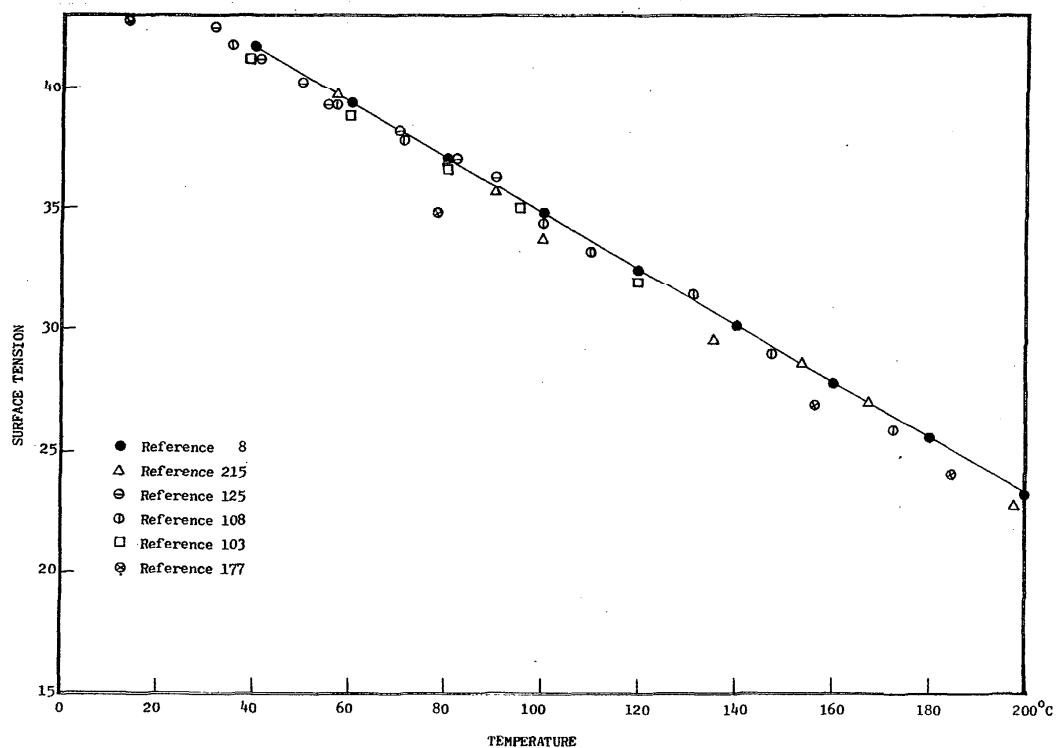


FIGURE 36. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for nitrobenzene (solid line passes thru recommended values).

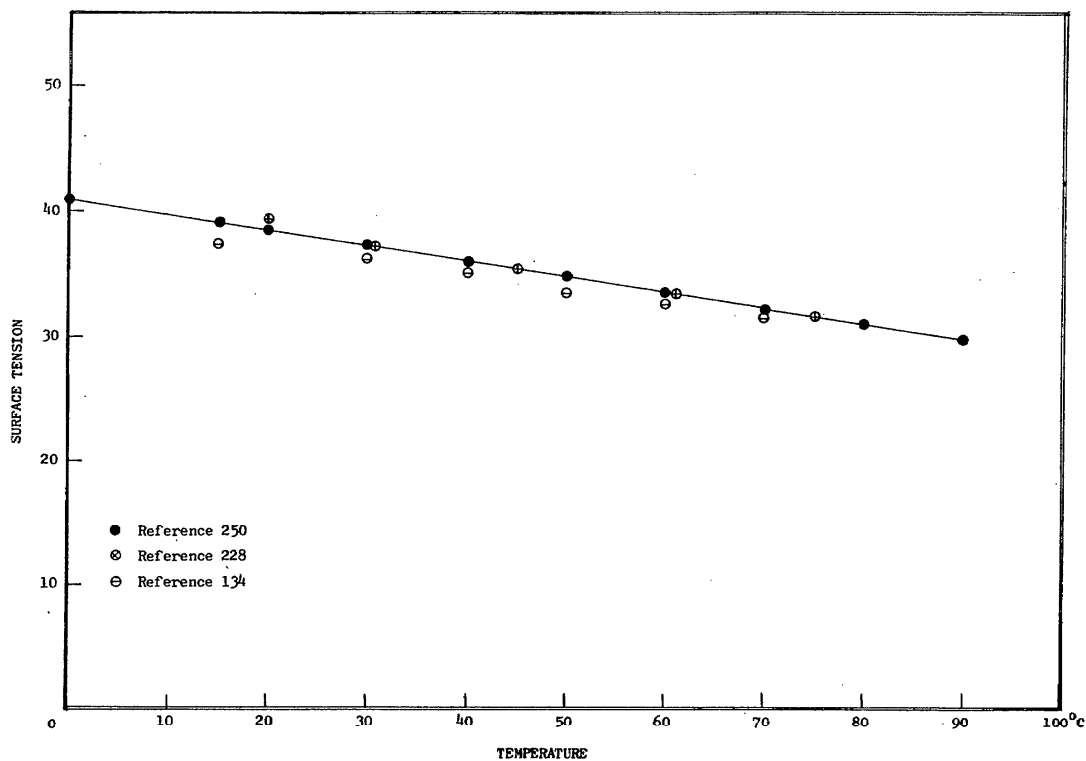


FIGURE 37. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements *N*-nitrosodimethylamine (solid line passes thru recommended values).

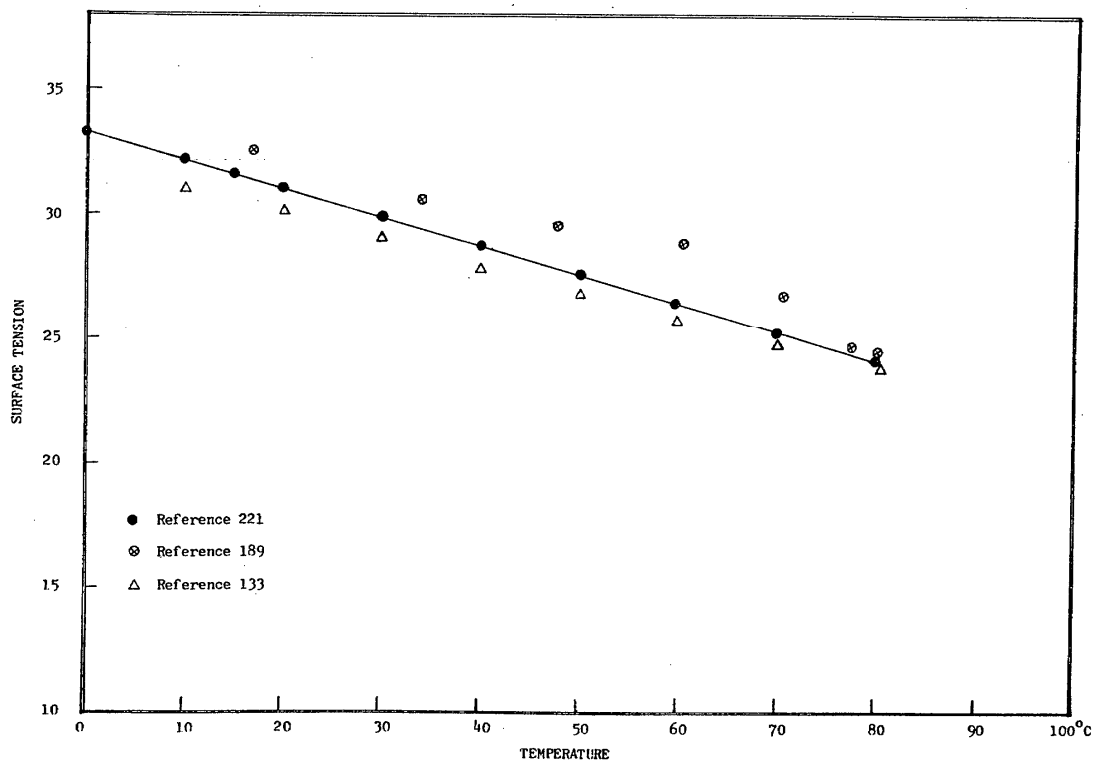


FIGURE 38. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 2,4-pentanedione (solid line passes thru recommended values).

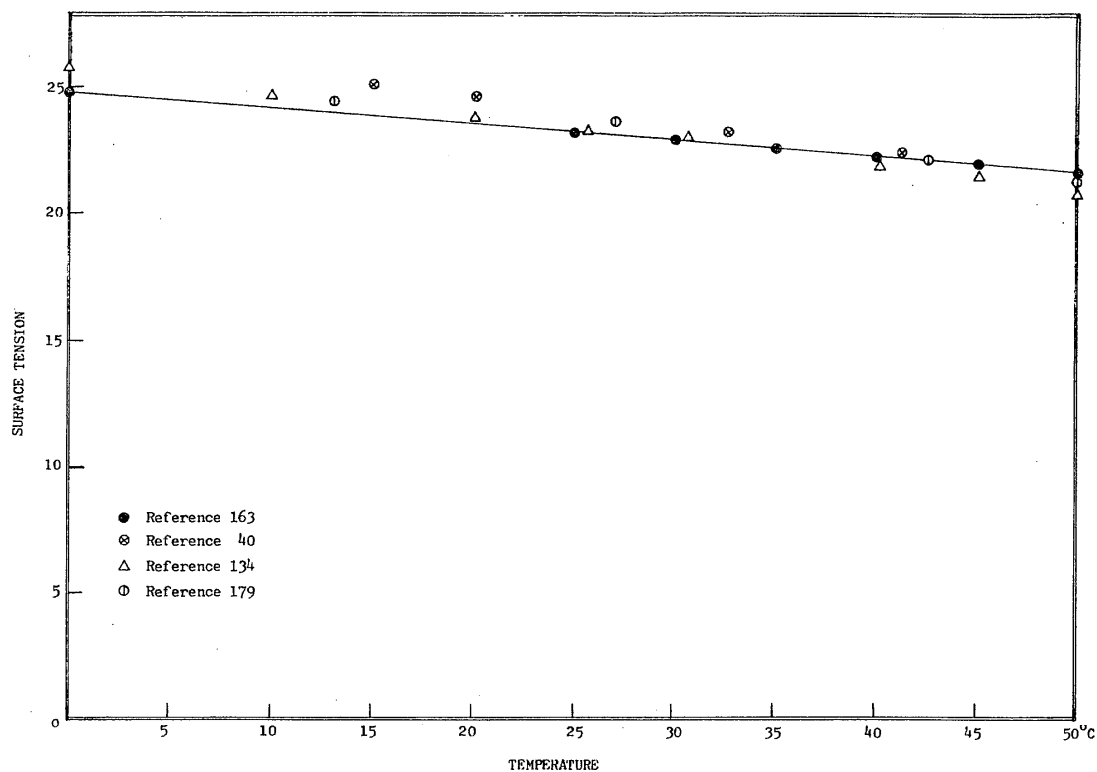


FIGURE 39. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 2-pentanone (solid line passes thru recommended values).

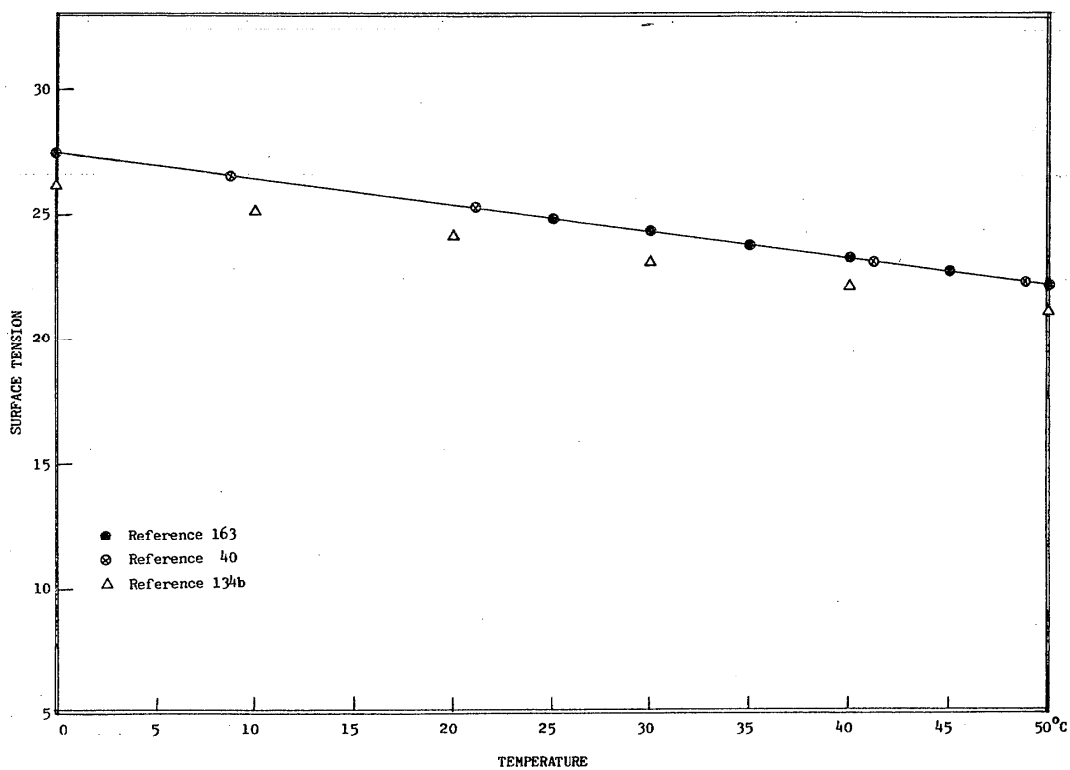


FIGURE 40. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 3-pentanone (solid line passes thru recommended values).



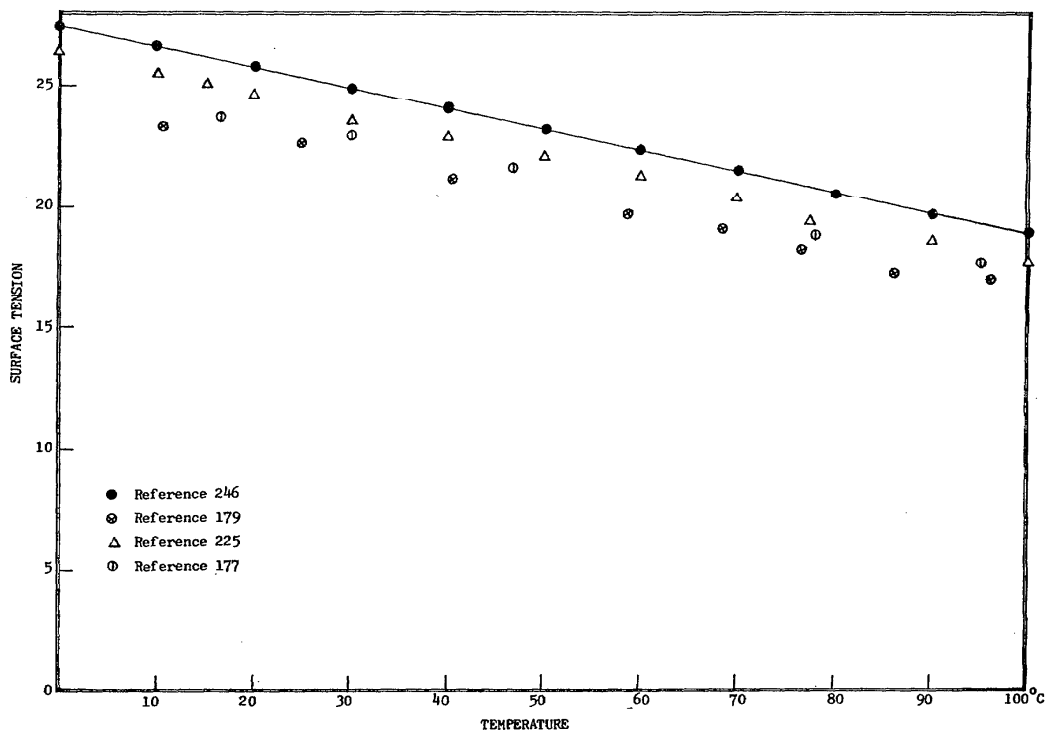


FIGURE 41. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for 1-pentanol (solid line passes thru recommended values).

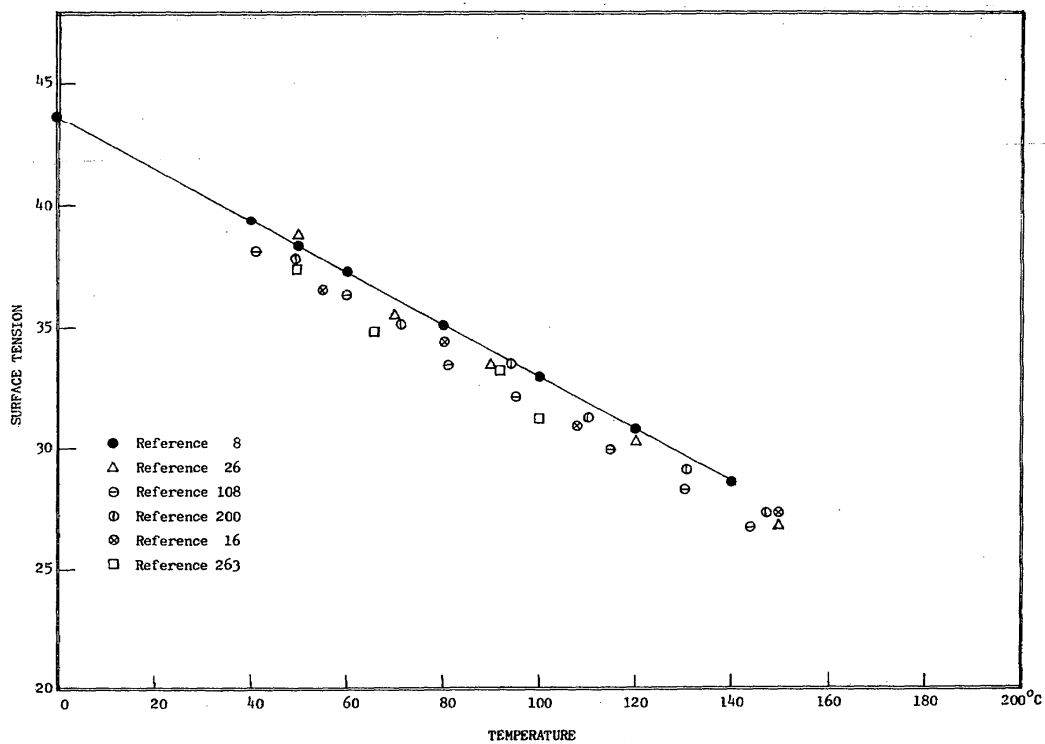


FIGURE 42. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for phenol (solid line passes thru recommended values).

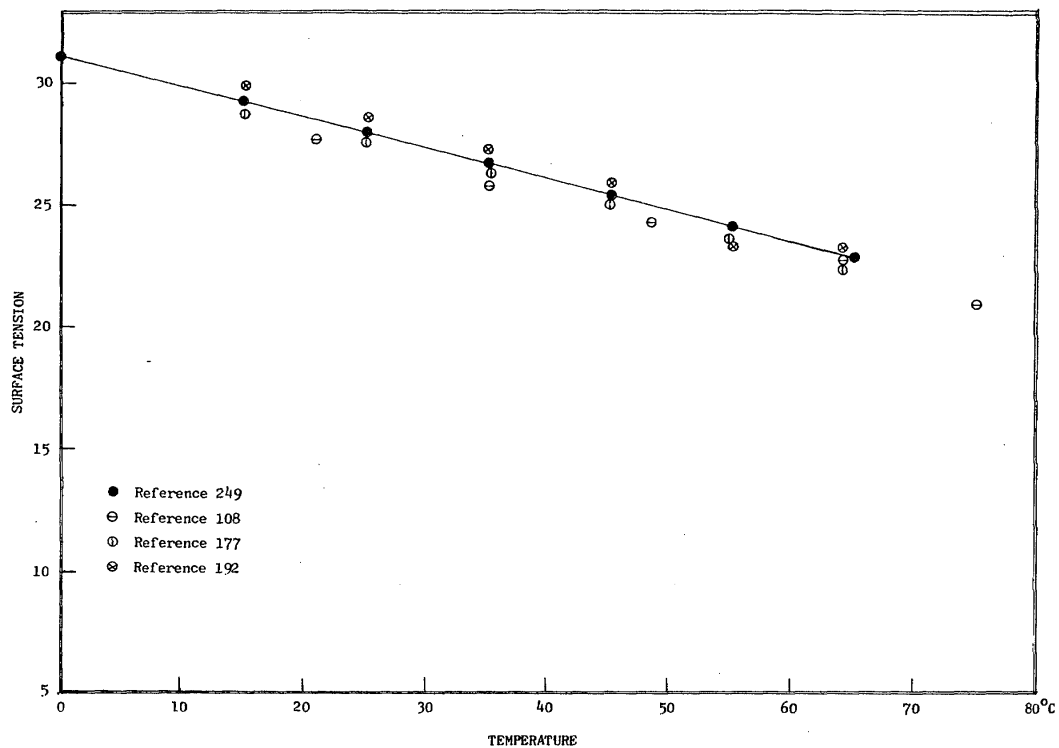


FIGURE 43. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for phosphorus trichloride (solid line passes thru recommended values).

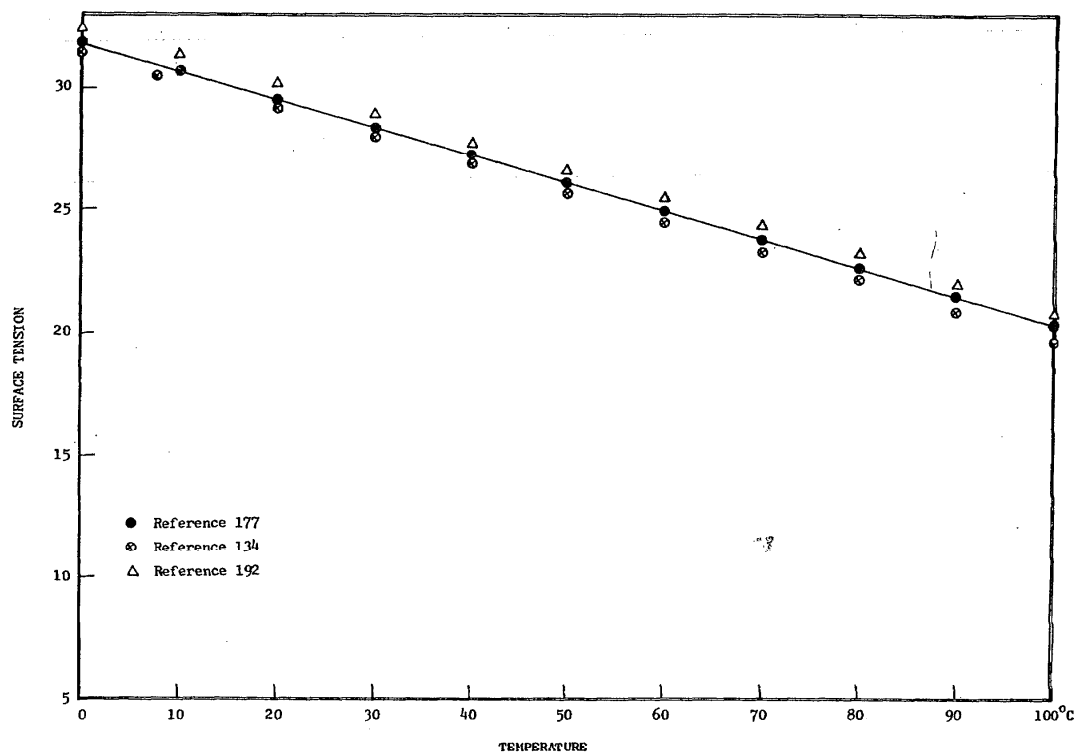


FIGURE 44. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for piperidine (solid line passes thru recommended values).

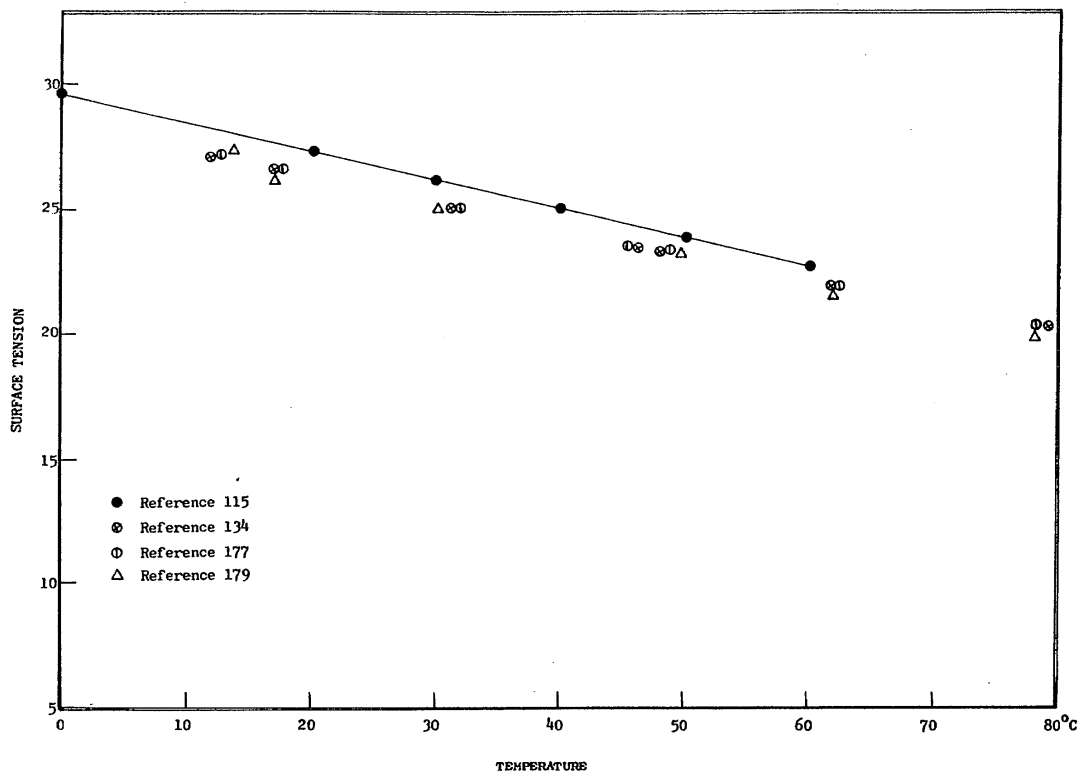


FIGURE 45. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for propionitrile (solid line passes thru recommended values).

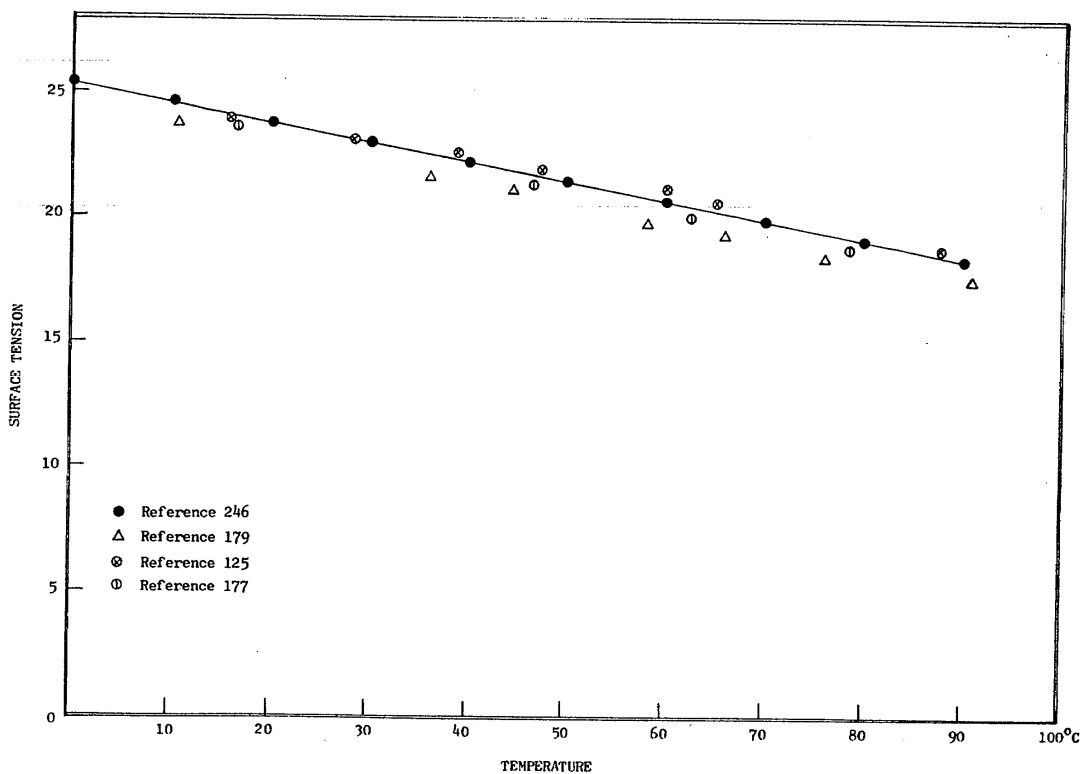


FIGURE 46. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for propyl alcohol (solid line passes thru recommended values).

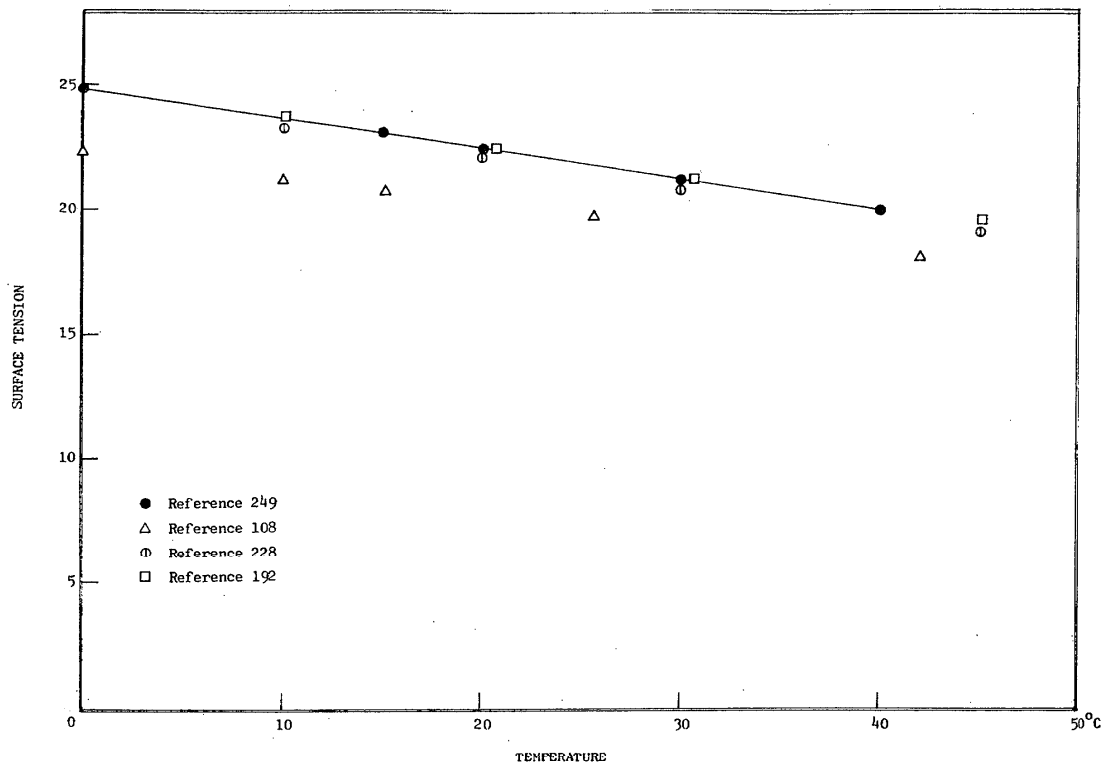


FIGURE 47. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for propylamine (solid line passes thru recommended values).

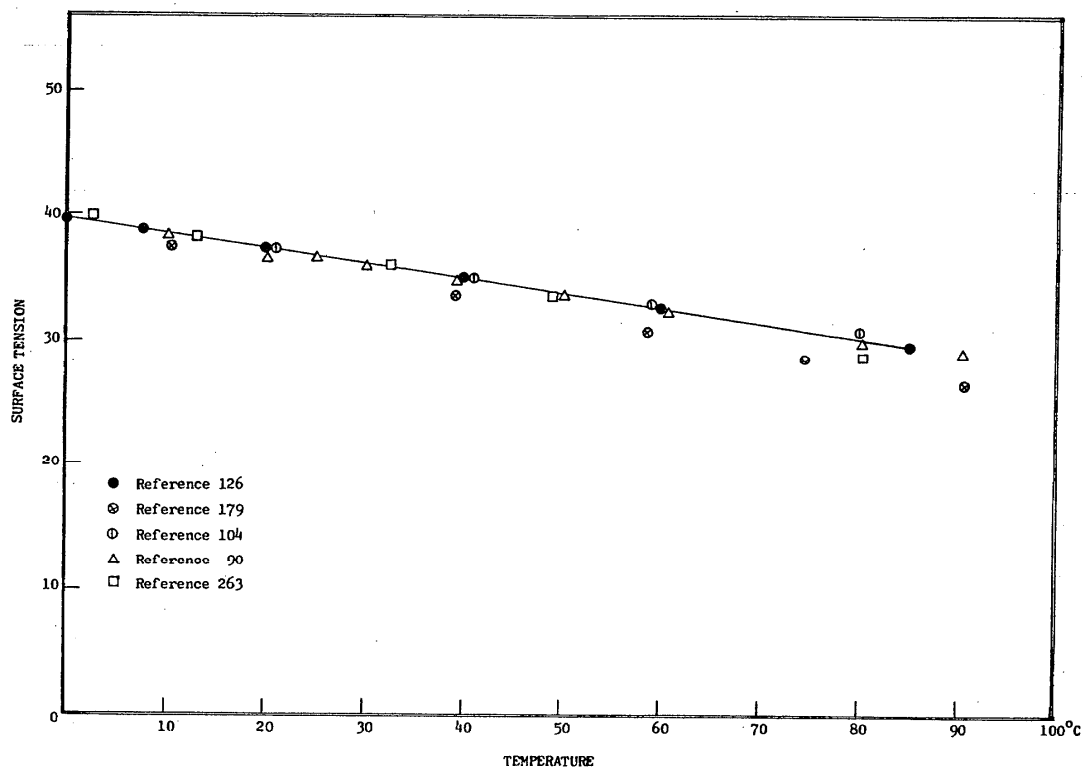


FIGURE 48. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for pyridine (solid line passes thru recommended values).

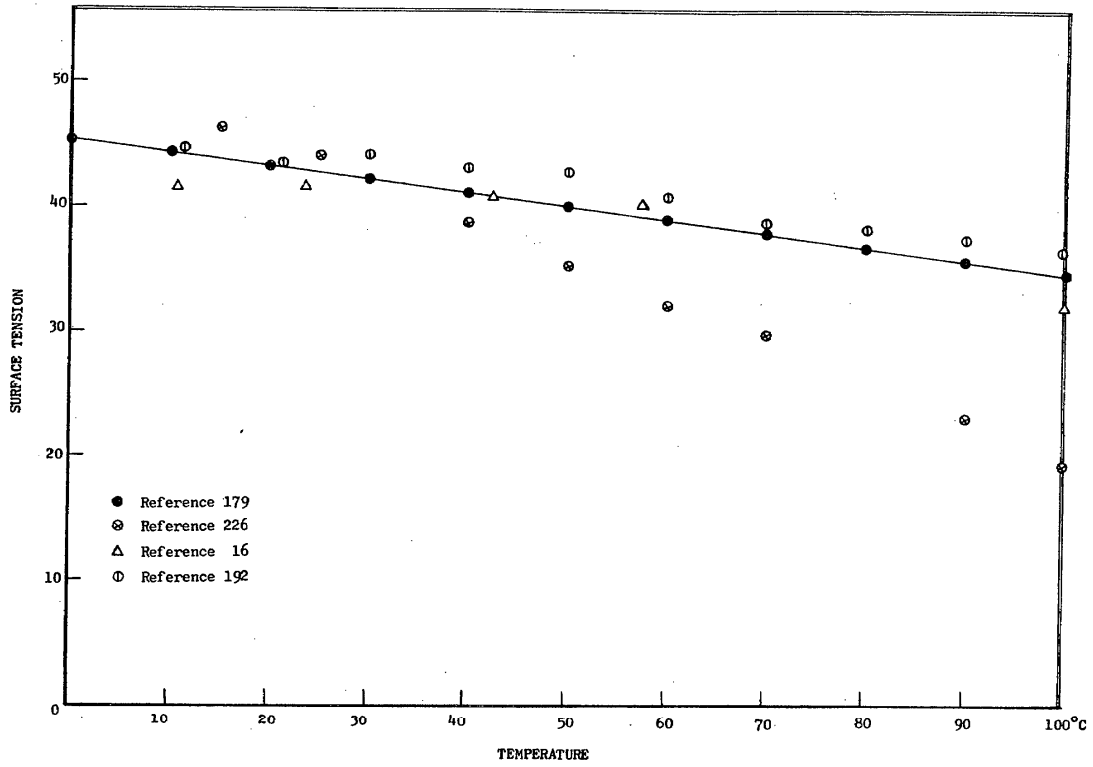


FIGURE 49. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for quinoline (solid line passes thru recommended values).

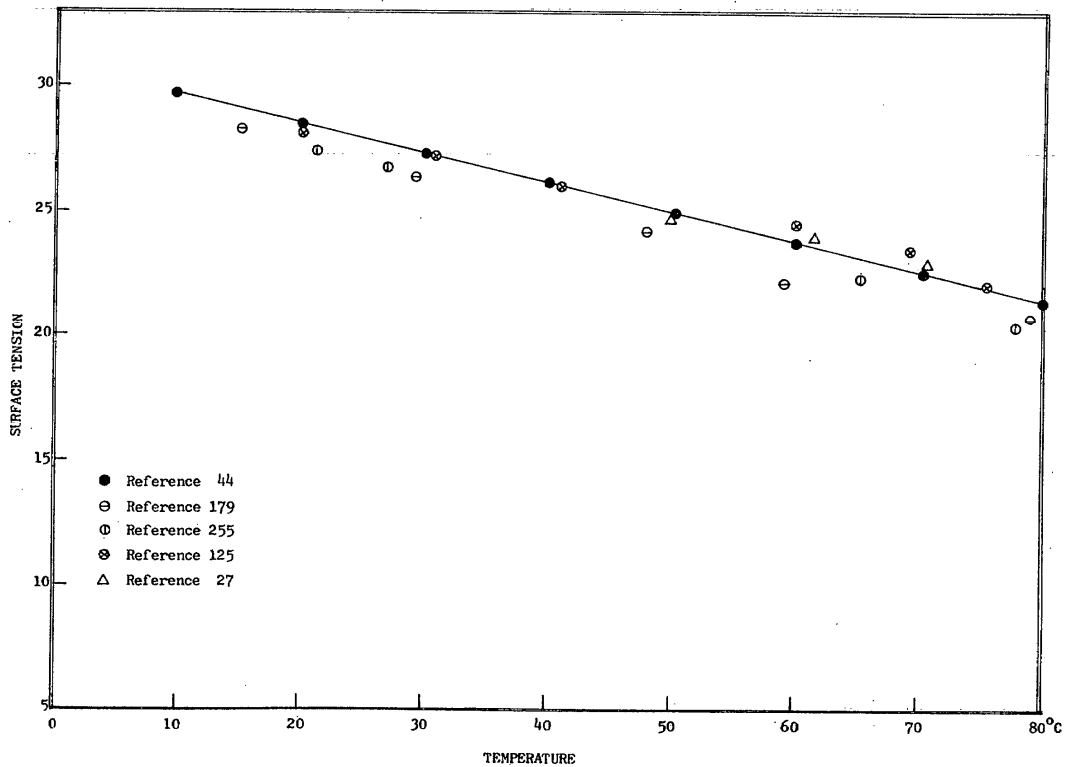


FIGURE 50. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for toluene (solid line passes thru recommended values).

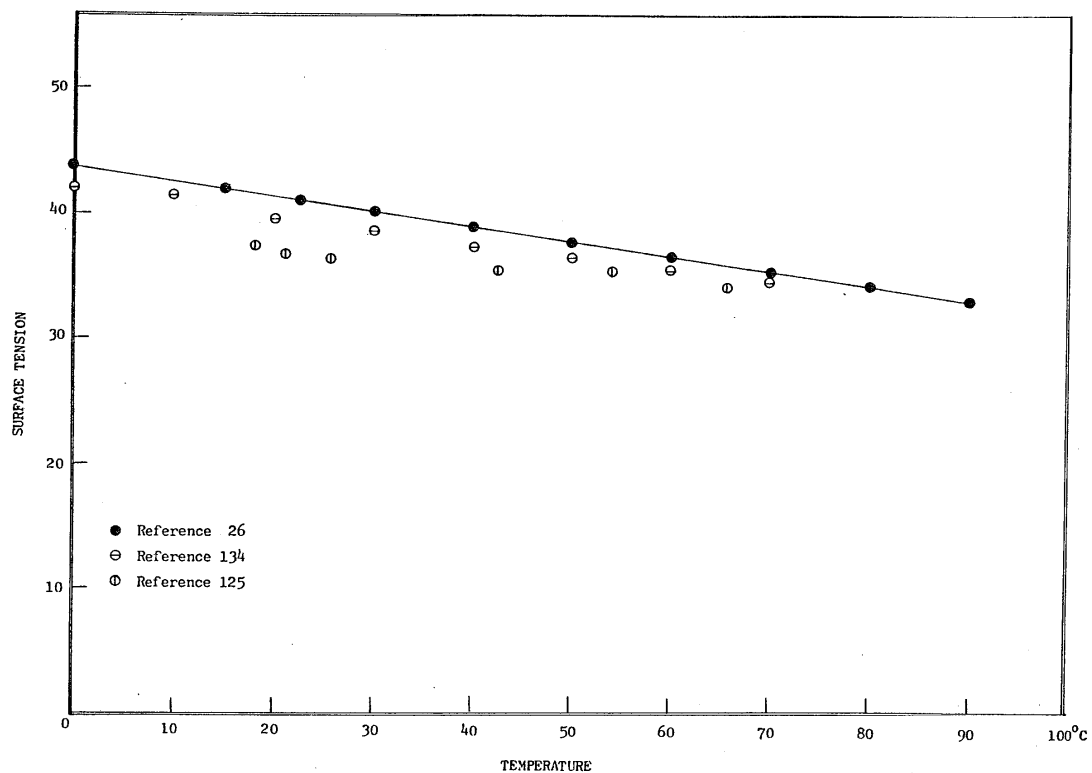


FIGURE 51. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *o*-toluidine (solid line passes thru recommended values).

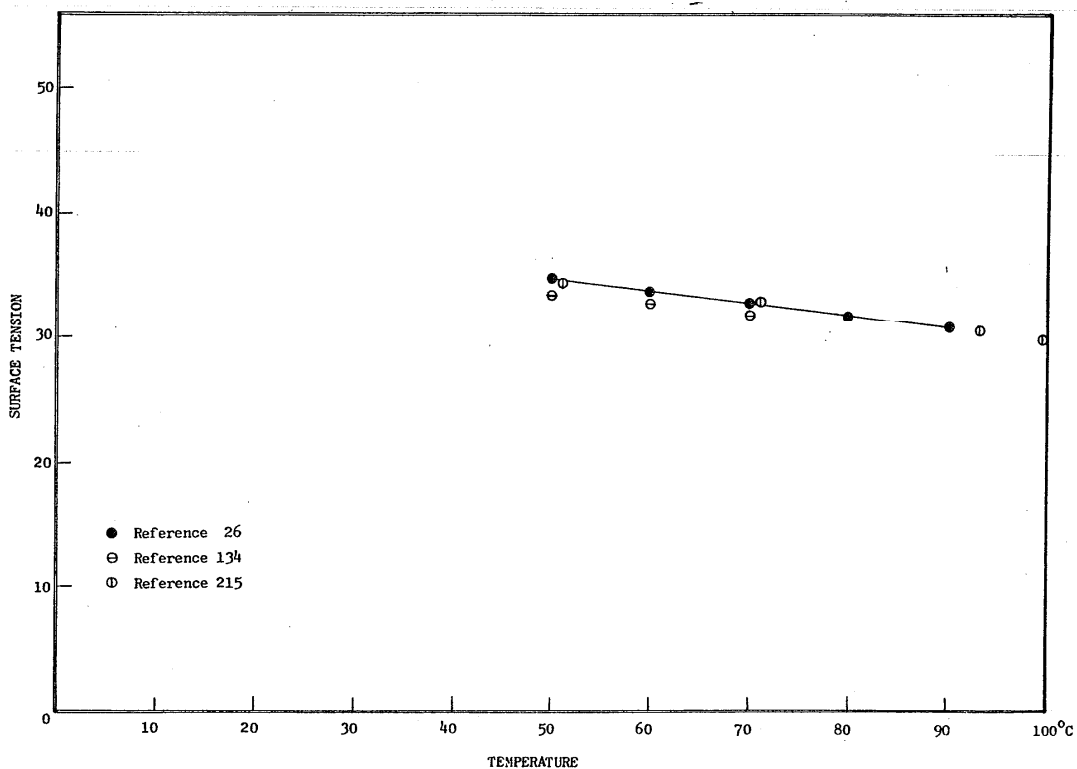


FIGURE 52. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *p*-toluidine (solid line passes thru recommended values).

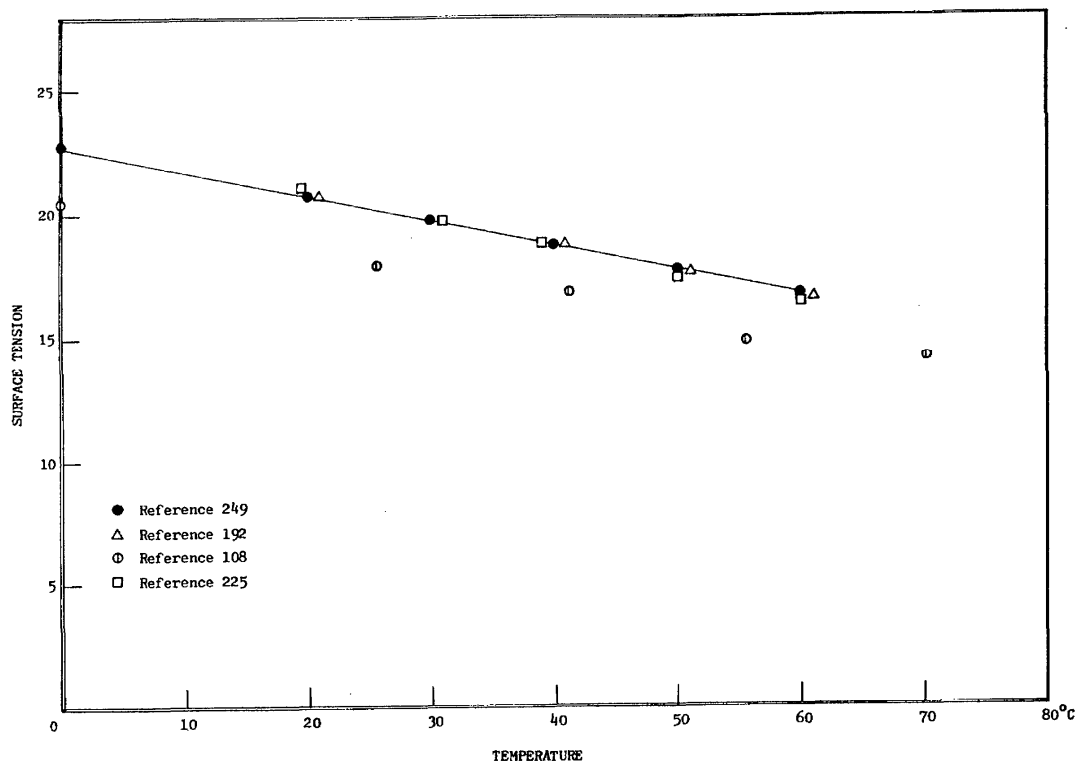


FIGURE 53. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for triethylamine (solid line passes thru recommended values).

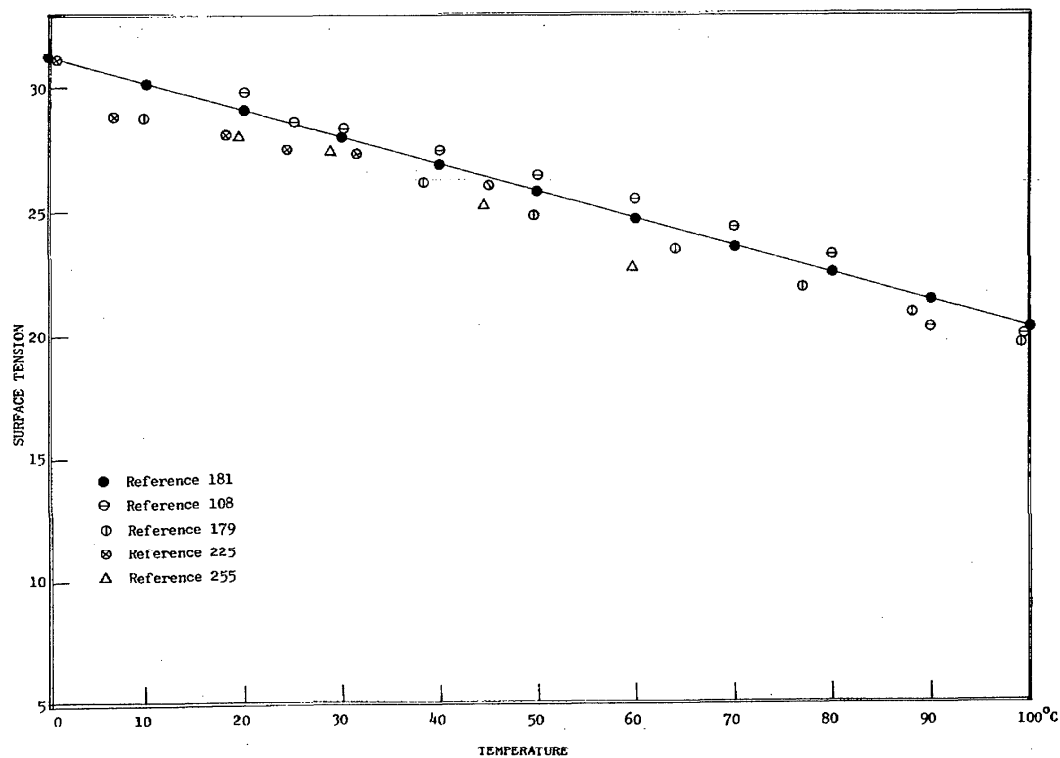


FIGURE 54. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *m*-xylene (solid line passes thru recommended values).

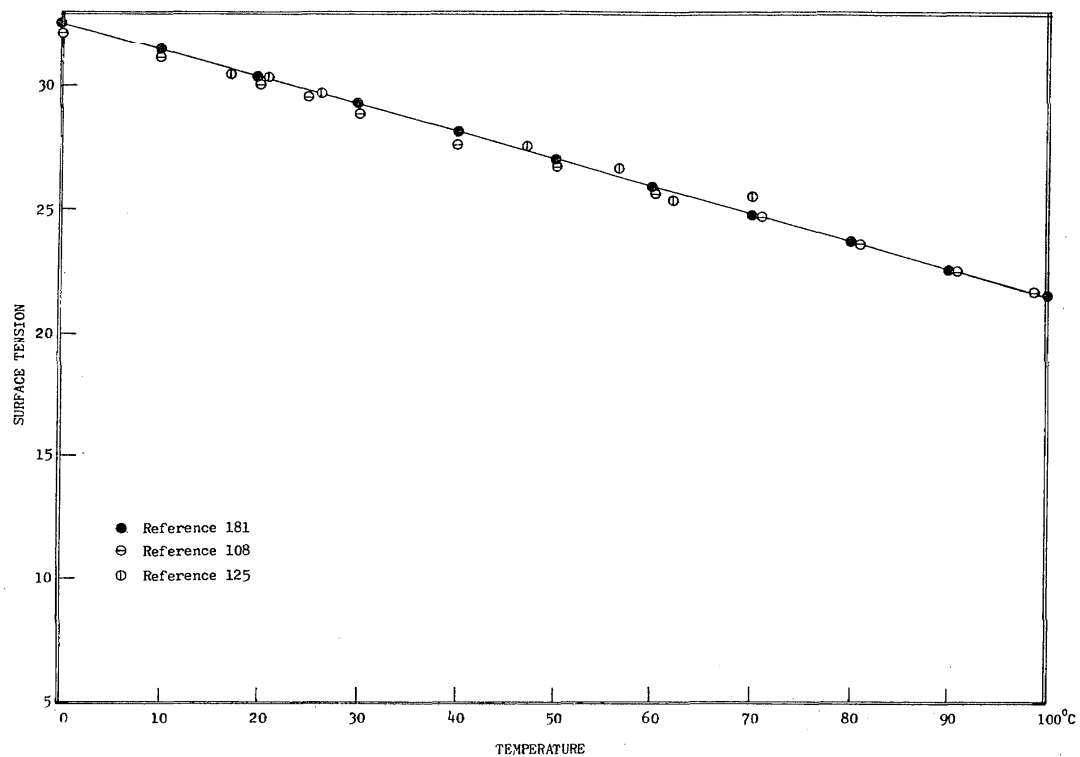


FIGURE 55. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *o*-xylene (solid line passes thru recommended values).

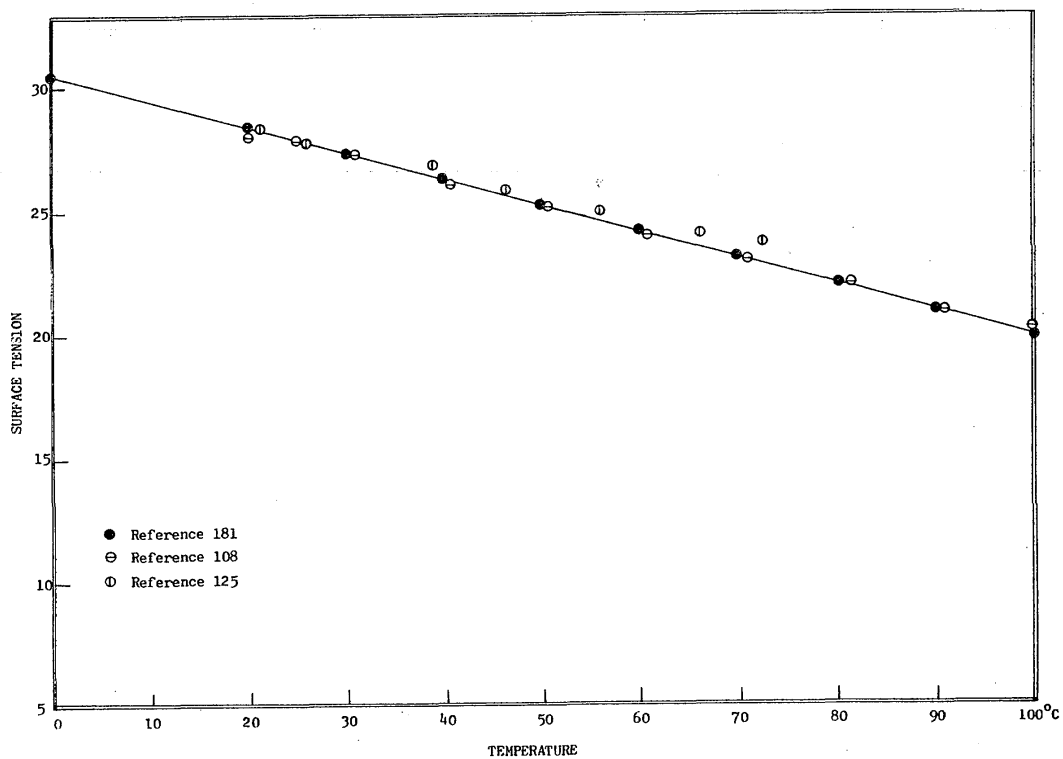


FIGURE 56. Comparison of recommended values for surface tension (in dyn/cm) as a function of temperature with selected measurements for *p*-xylene (solid line passes thru recommended values).



## 5. References

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## 6. Preface to Index of Compounds

This Index has been put together using the general principles which apply in the indexing of *Chemical Abstracts (CA)*. The indexing system of *CA* has evolved through the years and is flexible enough to allow a certain number of exceptions established by historical usage. It is not claimed that this Index conforms precisely with current *CA* usage, but a substantial effort has been made to use names that are unambiguous and readily recognized by current workers in the field.

The principle of organization on a functional basis followed by *CA* has been used, so that "butyl acetate"

is indexed as "acetic acid, butyl ester". The reader is referred to *CA* for a detailed description of the principles used. Trivial names, names from earlier systems of nomenclature which have wide acceptance, and, in some cases, alternate ways of entering the same name in the index have been included as cross references in many cases although no attempt has been made to be exhaustive.

The number of the table in which the compound can be found follows the name of the compound. A second number in italic type indicates that data on the compound are shown in the figure of that number.

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Dipropyl propylphosphonate	67.2	Eicosane	51.4
Dipropyl sulfide, addition compound with mercury,	68	1-Eicosene	51.2
Dipropylamine	19.2	$\alpha$ -Epichlorohydrin	44.3
Dipropylamine, <i>N</i> -nitroso-,	19.2	Ethane	29
Disilthiane	87.18	Ethane, bromo-,	12
Disiloxane, hexa(2-ethyl-1-butoxy)-,	87.4	Ethane, 1-bromo-2-ethoxy-,	12
Disiloxane, hexa(2-ethyl-1-hexoxy)-,	87.4	Ethane, 1-butoxy-1- <i>tert</i> -butoxy-,	87.5
Disiloxane, hexamethyl-,	75	Ethane, 1-butoxy-1-ethoxy-,	87.5
Distearin succinate	87.18	Ethane, 1,1-dibromo-,	72
Disulfide, butyl,	17.5	Ethane, 1,2-dibromo-,	72
Disulfide, <i>tert</i> -butyl,	17.5	Ethane, 1,1-dibutoxy-,	1
		Ethane, 1,1-dichloro-,	72
		Ethane, 1,2-dichloro-,	72
		Ethane, 1,1-di(2-chloroethoxy)-,	87.5
		Ethane, dichlorodifluoro-,	42.1
		Ethane, 1,1-diethoxy-,	1
		Ethane, 1,1-di(2-ethoxyethoxy)-,	87.5
		Ethane, difluorotetrachloro-,	42.1

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Ethane, 1,1-diisopentyloxy-,	87.5	Ethanol, 2,2',2''-nitrilotri-,	19.3
Ethane, 1,1-diisopropoxy-,	87.5	Ethanol, 2-octyloxy-,	87.7
Ethane, 1,1-dimethoxy-,	1	Ethanol, 2-(2-octyloxyethoxy)-,	87.7
Ethane, 1,1-dipentyloxy-,	87.5	Ethanol, 2-pentyloxy-,	87.7
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Ethane, 1,2-epoxy-. See Ethylene oxide.	29	Ethene. See Ethylene.	29
Ethane, 1-(2-hexyloxyethoxy)-2-(2-hydroxyethoxy)-,	87.7	Ether, allyl phenyl,	40.1
Ethane, 1-(2-hydroxyethoxy)-2-(2-octyloxyethoxy)-,	87.7	Ether, benzyl <i>o</i> -chlorophenyl,	77.1
Ethane, iodo-,	12	Ether, bis(2-chloroethyl),	44.2
Ethane, nitro-,	66	Ether, bis(2-ethoxyethyl),	40.1
Ethane, pentachloro-,	13	Ether, bis(2-(2-methoxyethoxy)ethyl),	40.1
Ethane, 1,1,2,2-tetrabromo-,	13	Ether, bis(2-methoxyethyl),	44.2
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Ethane, 1- <i>m</i> -tolyl-1- <i>o</i> -tolyl-,	87.18	Ether, butyl ethyl,	40.1
Ethane, 1- <i>o</i> -tolyl-1- <i>p</i> -tolyl-,	87.18	Ether, butyl methyl,	40.1
Ethane, 1,1,1-trichloro-,	13	Ether, butyl phenyl,	40.1
Ethane, 1,1,2-trichloro-,	13	Ether, <i>sec</i> -butyl vinyl,	87.5
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Ethanedioic acid, diheptyl ester. See Oxalic acid, diheptyl ester.	14.1	Ether, cyclohexyl methyl,	32
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Ethanedioic acid, dipropyl ester. See Oxalic acid, dipropyl ester.	37	Ether, diethyl, addition compound with boron trifluoride,	24.4
1,2-Ethanediol. See Ethylene glycol.	44.2	Ether, diheptyl,	40.1
Ethanesulfonic acid	17.1	Ether, dihexyl,	40.1
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Ethanol, 2-dodecyloxy-,	87.7	Ether, dipropyl,	40.1
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Ethanol, 2-ethoxy-,	8	Ether, ethyl hexyl,	40.1
Ethanol, 2-hexyloxy-,	87.7	Ether, ethyl methyl,	40.1
Ethanol, 2-(2-hexyloxyethoxy)-,	87.7	Ether, ethyl methyl, addition compound with boron trifluoride,	87.18
Ethanol, 2-isopropylamino-,	19.3	Ether, ethyl pentyl,	40.1
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		Ether, hexyl methyl,	40.1
		Ether, hexyl phenyl,	40.1
		Ether, isopropyl phenyl,	40.1
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Glycerol 1-palmitate	45	Hendecenoic acid, propyl ester. See Undecenoic	41
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Glycerol tristearate	45	Heptane, 2-chloro-2-methyl-,	80.1
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3-Heptanol, 3-methyl-,	4	Hexane, 2,4-dimethyl-,	51.3
4-Heptanol, 4-methyl-,	4	Hexane, 2,5-dimethyl-,	51.3
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3-Heptanone	58.2	Hexane, 3-ethyl-,	51.3
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3-Pentanone, 1-phenyl-,	58.3	Phenol, <i>o</i> -nitro-,	70
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Picolinic acid, propyl ester,	14.4	1-Propanethiol, 2-methyl-,	10
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Pyridine, 2,3-dimethyl-,	14.6	Salicylic acid, phenyl ester,	69.2
Pyridine, 2,4-dimethyl-,	14.6	Sebacic acid, bis(1H,1H-heptafluorobutyl) ester,	87.13
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2-Thiophenepropanol	83.6	<i>o</i> -Tolunitrile	30.1
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Thiamin tetrachloride	84	Tributyl phosphite	67.1
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Toluene, $\alpha$ -amino-. See Benzylamine.	19.2	Tributylamine, perfluoro-,	87.12
Toluene, 2-amino-. See <i>o</i> -Toluidine.	19.2, 51	Tricarballic acid, tris(1H,1H,5H-octadecano-	87.4
Toluene, 3-amino-. See <i>m</i> -Toluidine.	19.2	pernyl) ester,	87.13
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		Trihexyl phosphite	67.1

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